

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Shallow

Site ID: R063AY024SD

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



Physiographic Features

This site typically occurs on gently to steeply sloping uplands.

Landform: hill, ridge

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1600	2700
Slope (percent):	6	40
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:	Low	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 soils in this site are well drained and formed in residuum. The silty clay loam surface layer is two to six inches thick. The bedrock which occurs at 10 to 20 inches is soft, calcareous shale interbedded with lenses of soft sandstone. This typically forms a restrictive layer which inhibits plant roots. The soils have a moderate infiltration rate. 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. Subsurface soil layers are restrictive to water movement and penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 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: residuum
Parent Material Origin: sedimentary, unspecified
Surface Texture: silty clay, silty clay loam,
Surface Texture Modifier: none
Subsurface Texture Group: loamy
Surface Fragments ≤3" (% Cover): 0-25
Surface Fragments >3" (%Cover): 0-5
Subsurface Fragments ≤3" (% Volume): 0-25
Subsurface Fragments >3" (% Volume): 0

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class	well	well
Permeability Class:	moderate	moderate
Depth to Bedrock (inches):	10	20
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	5
Soil Reaction (1:1 Water)*:	7.4	9.0
Soil Reaction (0.1M CaCl₂)*:	NA	NA
Available Water Capacity (inches)*:	2	3
Calcium Carbonate Equivalent (percent)*:	1	15

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

Plant Communities

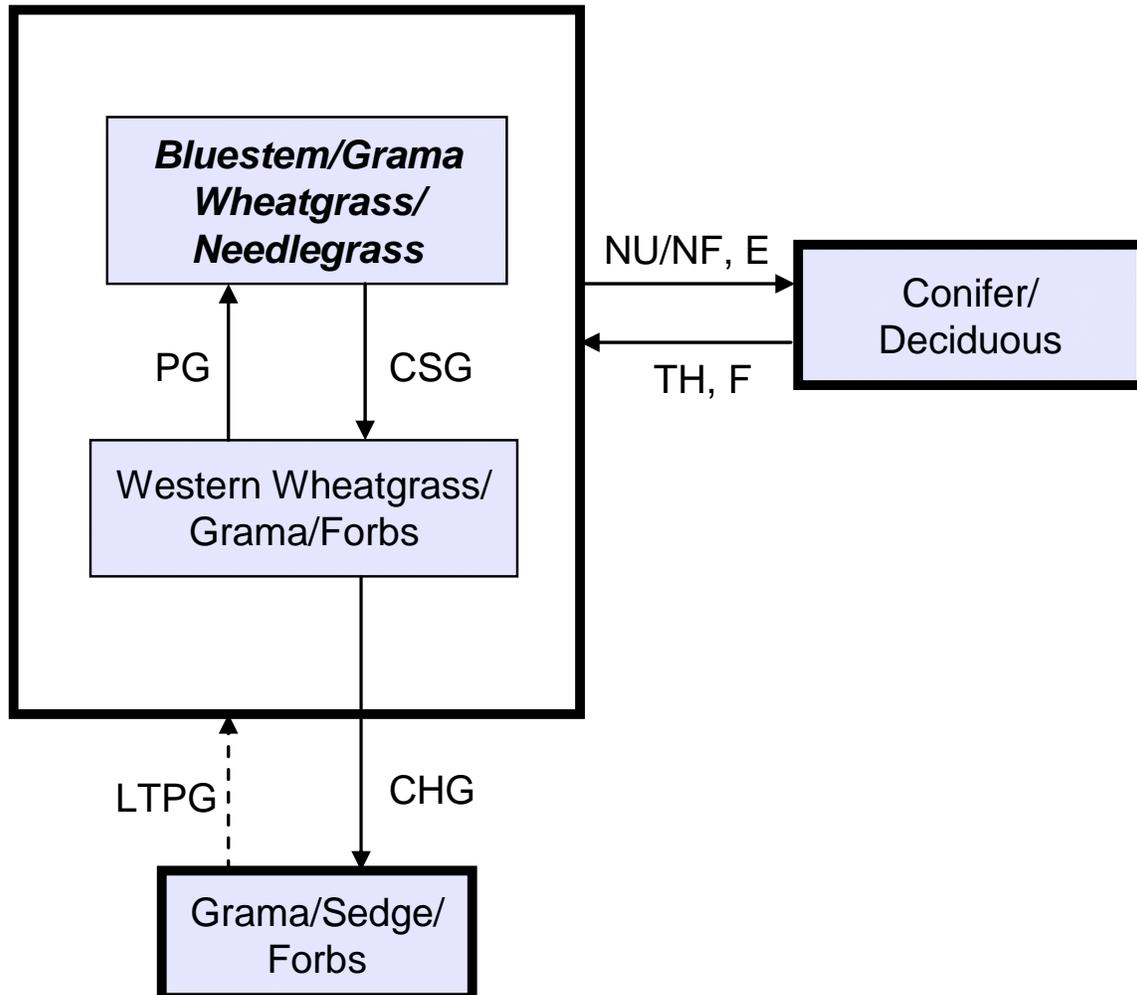
Ecological Dynamics of the Site:

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.

Interpretations are primarily based on the Bluestem/Grama/Wheatgrass/Needlegrass Plant Community, which is considered to be climax. 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 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 will be discussed in more detail in the plant community descriptions following the diagram.

Plant Communities and Transitional Pathways



CSG - Continuous seasonal grazing (grazing a unit for an entire portion of a growing season, and the same season every year); **E** - Encroachment; **F** - Fire; **CHG** - Continuous heavy grazing (heavy levels of grazing of a unit during most or all of the growing season); **LTPG** - Long-term prescribed grazing; **NU/NF** - Non-use, no fire for extended periods; **PG** – Prescribed Grazing (planned, controlled harvest of vegetation with grazing or browsing animals – see FOTG, Section IV, 528); **TH** - Thinning.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Bluestem/Grama/ Wheatgrass/Needlegrass		
			Group	lbs./acre	% Comp
GRASSES & GRASS-LIKES				1280 - 1440	80 - 90
MID WARM-SEASON GRASSES			1	240 - 480	15 - 30
sideoats grama	Bouteloua curtipendula	BOCU	1	160 - 400	10 - 25
little bluestem	Schizachyrium scoparium	SCSC	1	80 - 240	5 - 15
plains muhly	Muhlenbergia cuspidata	MUCU3	1	16 - 80	1 - 5
RHIZOMATOUS WHEATGRASS			2	160 - 320	10 - 20
western wheatgrass	Pascopyrum smithii	PASM	2	160 - 320	10 - 20
slender wheatgrass	Elymus trachycaulus	ELTR7	2	0 - 80	0 - 5
SHORT WARM-SEASON GRASSES			3	80 - 240	5 - 15
blue grama	Bouteloua gracilis	BOGR2	3	80 - 240	5 - 15
buffalograss	Bouteloua dactyloides	BODA2	3	32 - 160	2 - 10
hairy grama	Bouteloua hirsuta	BOHI2	3	0 - 80	0 - 5
NEEDLEGRASS			4	80 - 240	5 - 15
needleandthread	Hesperostipa comata ssp. comata	HECOC8	4	80 - 240	5 - 15
green needlegrass	Nassella viridula	NAVI4	4	16 - 80	1 - 5
TALL WARM-SEASON GRASSES			5	32 - 160	2 - 10
big bluestem	Andropogon gerardii	ANGE	5	16 - 128	1 - 8
prairie sandreed	Calamovilfa longifolia	CALO	5	16 - 80	1 - 5
OTHER NATIVE GRASSES			6	32 - 128	2 - 8
dropseed	Sporobolus spp.	SPORO	6	16 - 80	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	6	16 - 48	1 - 3
threeawn	Aristida spp.	ARIST	6	0 - 32	0 - 2
GRASS-LIKES			7	32 - 160	2 - 10
threadleaf sedge	Carex filifolia	CAFI	7	16 - 128	1 - 8
needleleaf sedge	Carex duriuscula	CADU6	7	16 - 80	1 - 5
other grass-like		ZGL		0 - 80	0 - 5
FORBS			9	80 - 160	5 - 10
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	9	0 - 16	0 - 1
American vetch	Vicia americana	VIAM	9	0 - 32	0 - 2
bracted spiderwort	Tradescantia bracteata	TRBR	9	0 - 16	0 - 1
catclaw sensitive briar	Mimosa nuttallii	MINU6	9	0 - 32	0 - 2
cudweed sagewort	Artemisia ludoviciana	ARLU	9	16 - 48	1 - 3
dalea	Dalea spp.	DALEA	9	0 - 32	0 - 2
deervetch	Lotus unifoliolatus var. unifoliolatus	LOUNU	9	0 - 16	0 - 1
dotted gayfeather	Liatris punctata	LIPU	9	16 - 64	1 - 4
erigonum	Eriogonum spp.	ERIOG	9	0 - 16	0 - 1
false boneset	Brickellia eupatorioides	BREU	9	0 - 32	0 - 2
goldenrod	Solidago spp.	SOLID	9	16 - 32	1 - 2
green sagewort	Artemisia dracunculul	ARDR4	9	16 - 48	1 - 3
hairy goldaster	Heterotheca villosa	HEVI4	9	0 - 16	0 - 1
heath aster	Symphotrichum ericoides	SYER	9	16 - 32	1 - 2
hoary puccoon	Lithospermum canescens	LICA12	9	0 - 16	0 - 1
Indian breadroot	Pediemelum esculentum	PEES	9	0 - 16	0 - 1
Lambert crazyweed	Oxytropis lambertii	OXLA3	9	0 - 16	0 - 1
milkvetch	Astragalus spp.	ASTRA	9	16 - 32	1 - 2
penstemon	Penstemon spp.	PENST	9	16 - 32	1 - 2
plains larkspur	Delphinium carolinianum ssp. virescens	DECAV2	9	0 - 16	0 - 1
prairie coneflower	Ratibida columnifera	RACO3	9	16 - 32	1 - 2
prairie smoke	Geum triflorum	GETR	9	0 - 16	0 - 1
purple coneflower	Echinacea angustifolia	ECAN2	9	32 - 80	2 - 5
purple prairie clover	Dalea purpurea	DAPU5	9	16 - 48	1 - 3
pusstoes	Antennaria spp.	ANTEN	9	16 - 32	1 - 2
scarlet gaura	Gaura coccinea	GACO5	9	0 - 16	0 - 1
scarlet globemallow	Sphaeralcea coccinea	SPCO	9	16 - 32	1 - 2
scurfpea	Psoraleidum spp.	PSORA2	9	16 - 48	1 - 3
spiny phlox	Phlox hoodii	PHHO	9	0 - 16	0 - 1
stemless hymenoxys	Tetraneuris acaulis var. acaulis	TEACA2	9	0 - 16	0 - 1
stiff sunflower	Helianthus pauciflorus	HEPA19	9	16 - 32	1 - 2
tall breadroot	Pediemelum cuspidatum	PECU3	9	0 - 16	0 - 1
textile onion	Allium textile	ALTE	9	0 - 16	0 - 1
wavyleaf thistle	Cirsium undulatum	CIUN	9	0 - 16	0 - 1
western yarrow	Achillea millefolium var. occidentalis	ACMIO	9	16 - 32	1 - 2
woolly Indianwheat	Plantago patagonica	PLPA2	9	0 - 16	0 - 1
native forbs		2FN	9	16 - 80	1 - 5
SHRUBS			10	32 - 160	2 - 10
American plum	Prunus americana	PRAM	10	0 - 48	0 - 3
cactus	Opuntia spp.	OPUNT	10	0 - 32	0 - 2
chokecherry	Prunus virginiana	PRVI	10	0 - 32	0 - 2
creeping juniper	Juniperus horizontalis	JUHO2	10	0 - 16	0 - 1
dwarf false indigo	Amorpha nana	AMNA	10	0 - 16	0 - 1
fringed sagewort	Artemisia frigida	ARFR4	10	16 - 80	1 - 5
rose	Rosa spp.	ROSA5	10	16 - 48	1 - 3
skunkbush sumac	Rhus trilobata	RHTR	10	0 - 32	0 - 2
snowberry	Symphoricarpos spp.	SYMPH	10	0 - 32	0 - 2
yucca	Yucca glauca	YUGL	10	0 - 32	0 - 2
other shrubs		2SHRUB	10	0 - 80	0 - 5
TREES			11	0 - 32	0 - 2
eastern redcedar	Juniperus virginiana	JUVI	11	0 - 32	0 - 2
Rocky Mountain juniper	Juniperus scopulorum	JJUSC2	11	0 - 32	0 - 2
bur oak	Quercus macrocarpa	QUMA2	11	0 - 32	0 - 2
other trees		2TREE	11	0 - 32	0 - 2

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	895	1368	-1805
FORBS	75	120	-180
SHRUBS	30	96	-180
TREES	0	16	-35
TOTAL	1000	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	Bluestem/Grama/ Wheatgrass/Needlegrass			Western Wheatgrass/ Grama/Forbs			Grama/Sedge/Forbs			Conifer/Deciduous		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1280 - 1440	80 - 90		980 - 1190	70 - 85		700 - 850	70 - 85		840 - 1020	70 - 85
MID WARM-SEASON GRASSES		1	240 - 480	15 - 30	1	140 - 280	10 - 20	1	50 - 100	5 - 10	1	60 - 180	5 - 15
sideoats grama	BOCU	1	160 - 400	10 - 25	1	70 - 210	5 - 15	1	0 - 100	0 - 10	1	0 - 180	0 - 15
little bluestem	SCSC	1	80 - 240	5 - 15	1	0 - 140	0 - 10	1	0 - 100	0 - 10	1	0 - 120	0 - 10
plains muhly	MUCU3	1	16 - 80	1 - 5	1	0 - 70	0 - 5	1	0 - 20	0 - 2	1	12 - 60	1 - 5
RHIZOMATOUS WHEATGRASS		2	160 - 320	10 - 20	2	210 - 420	15 - 30	2	0 - 50	0 - 5	2	0 - 120	0 - 10
western wheatgrass	PASM	2	160 - 320	10 - 20	2	140 - 350	10 - 25	2	10 - 50	1 - 5	2	0 - 180	0 - 15
slender wheatgrass	ELTR7	2	0 - 80	0 - 5	2	0 - 70	0 - 5	2	0 - 20	0 - 2	2	0 - 12	0 - 1
SHORT WARM-SEASON GRASSES		3	80 - 240	5 - 15	3	140 - 350	10 - 25	3	100 - 350	10 - 35	3	60 - 180	5 - 15
blue grama	BOGR2	3	80 - 240	5 - 15	3	140 - 280	10 - 20	3	100 - 350	10 - 35	3	60 - 180	5 - 15
buffalograss	BODA2	3	32 - 160	2 - 10	3	70 - 210	5 - 15	3	0 - 50	0 - 5	3	0 - 60	0 - 5
hairy grama	BOHI2	3	0 - 80	0 - 5	3	0 - 70	0 - 5	3	100 - 350	10 - 35	3	0 - 120	0 - 10
NEEDLEGRASS		4	80 - 240	5 - 15	4	70 - 140	5 - 10	4	0 - 100	0 - 10	4	60 - 180	5 - 15
needleandthread	HEGOC8	4	80 - 240	5 - 15	4	0 - 112	0 - 8	4	20 - 100	2 - 10	4	60 - 180	5 - 15
green needlegrass	NAVI4	4	16 - 80	1 - 5	4	0 - 70	0 - 5				4	0 - 60	0 - 5
TALL WARM-SEASON GRASSES		5	32 - 160	2 - 10	5	28 - 70	2 - 5	5	20 - 80	2 - 8	5	0 - 60	0 - 5
big bluestem	ANGE	5	16 - 128	1 - 8	5	14 - 70	1 - 5				5	0 - 60	0 - 5
prairie sandreed	CALO	5	16 - 80	1 - 5	5	14 - 42	1 - 3	5	20 - 100	2 - 10	5	0 - 60	0 - 5
OTHER NATIVE GRASSES		6	32 - 128	2 - 8	6	14 - 70	1 - 5	6	50 - 150	5 - 15	6	0 - 96	0 - 8
dropseed	SPORO	6	16 - 80	1 - 5	6	14 - 42	1 - 3	6	20 - 100	2 - 10	6	0 - 36	0 - 3
prairie junegrass	KOMA	6	16 - 48	1 - 3	6	14 - 28	1 - 2	6	0 - 30	0 - 3	6	12 - 60	1 - 5
threeawn	ARIST	6	0 - 32	0 - 2	6	0 - 14	0 - 1	6	20 - 100	2 - 10	6	0 - 36	0 - 3
GRASS-LIKES		7	32 - 160	2 - 10	7	70 - 140	5 - 10	7	100 - 200	10 - 20	7	60 - 180	5 - 15
threadleaf sedge	CAFI	7	16 - 128	1 - 8	7	28 - 70	2 - 5	7	100 - 150	10 - 15	7	60 - 120	5 - 10
needleleaf sedge	CADU6	7	16 - 80	1 - 5	7	28 - 70	2 - 5	7	100 - 150	10 - 15	7	60 - 120	5 - 10
other grass-likes	ZGL	7	0 - 80	0 - 5	7	0 - 70	0 - 5	7	0 - 50	0 - 5	7	0 - 60	0 - 5
FORBS		9	80 - 160	5 - 10	9	140 - 210	10 - 15	9	50 - 200	5 - 20	9	60 - 120	5 - 10
American pasqueflower	PUPAM	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
American vetch	VIAM	9	0 - 32	0 - 2	9	0 - 42	0 - 3	9	10 - 50	1 - 5	9	0 - 24	0 - 2
bracted spiderwort	TRBR	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
catclaw sensitive briar	MINU6	9	0 - 32	0 - 2	9	0 - 28	0 - 2	9	0 - 20	0 - 2	9	0 - 24	0 - 2
cutweed sagewort	ARLU	9	16 - 48	1 - 3	9	28 - 70	2 - 5	9	50 - 100	5 - 10	9	24 - 60	2 - 5
dalea	DALEA	9	0 - 32	0 - 2	9	0 - 28	0 - 2	9	10 - 20	1 - 2	9	12 - 36	1 - 3
deervetch	LOUNU	9	0 - 16	0 - 1	9	0 - 42	0 - 3	9	0 - 30	0 - 3	9	0 - 36	0 - 3
dotted gayfeather	LIPU	9	16 - 64	1 - 4	9	14 - 56	1 - 4	9	10 - 50	1 - 5	9	12 - 60	1 - 5
erigonum	ERIOG	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	10 - 30	1 - 3	9	0 - 36	0 - 3
false boneset	BREU	9	0 - 32	0 - 2	9	0 - 28	0 - 2	9	0 - 20	0 - 2	9	0 - 24	0 - 2
goldenrod	SOLID	9	16 - 32	1 - 2	9	14 - 42	1 - 3	9	30 - 70	3 - 7	9	12 - 60	1 - 5
green sagewort	ARDR4	9	16 - 48	1 - 3	9	14 - 42	1 - 3	9	10 - 20	1 - 2	9	12 - 24	1 - 2
hairy goldaster	HEVI4	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 30	0 - 3	9	0 - 24	0 - 2
heath aster	SYER	9	16 - 32	1 - 2	9	14 - 42	1 - 3	9	20 - 50	2 - 5	9	0 - 36	0 - 3
hoary puccoon	LICA12	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
Indian breadroot	PEDIO2	9	0 - 16	0 - 1	9	0 - 14	0 - 1				9	12 - 60	1 - 5
Lambert crazyweed	OXLA3	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
milkvetch	ASTRA	9	16 - 32	1 - 2	9	14 - 28	1 - 2	9	20 - 50	2 - 5	9	12 - 36	1 - 3
penstemon	PENST	9	16 - 32	1 - 2	9	0 - 28	0 - 2	9	10 - 20	1 - 2	9	0 - 24	0 - 2
plains larkspur	DECAV2	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
prairie coneflower	RACO3	9	16 - 32	1 - 2	9	14 - 42	1 - 3	9	10 - 30	1 - 3	9	0 - 36	0 - 3
prairie smoke	GETR	9	0 - 16	0 - 1	9	0 - 14	0 - 1						
purple coneflower	ECA2	9	32 - 80	2 - 5	9	14 - 70	1 - 5	9	10 - 30	1 - 3	9	12 - 36	1 - 3
purple prairie clover	DAPU5	9	16 - 48	1 - 3	9	0 - 42	0 - 3	9	10 - 30	1 - 3	9	0 - 36	0 - 3
pussytoes	ANTEN	9	16 - 32	1 - 2	9	14 - 28	1 - 2	9	10 - 30	1 - 3	9	12 - 36	1 - 3
scarlet gaura	GACO5	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	12 - 24	1 - 2
scarlet globemallow	SPCO	9	16 - 32	1 - 2	9	14 - 42	1 - 3	9	10 - 30	1 - 3	9	12 - 36	1 - 3
scurfspea	PSORA2	9	16 - 48	1 - 3	9	14 - 42	1 - 3	9	10 - 50	1 - 5	9	12 - 60	1 - 5
spiny phlox	PHHO	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 30	0 - 3	9	0 - 24	0 - 2
stemless hymenoxys	TEACA2	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 30	0 - 3	9	0 - 24	0 - 2
stiff sunflower	HEPA19	9	16 - 32	1 - 2	9	14 - 28	1 - 2	9	0 - 10	0 - 1	9	0 - 24	0 - 2
tall breadroot	PECU3	9	0 - 16	0 - 1	9	0 - 14	0 - 1	9	0 - 10	0 - 1	9	0 - 12	0 - 1
textile onion	ALTE	9	0 - 16	0 - 1	9	0 - 28	0 - 2	9	0 - 20	0 - 2	9	0 - 12	0 - 1
wavyleaf thistle	CIUN	9	0 - 16	0 - 1	9	0 - 28	0 - 2	9	0 - 20	0 - 2	9	0 - 24	0 - 2
western yarrow	ACMIO	9	16 - 32	1 - 2	9	14 - 42	1 - 3	9	10 - 50	1 - 5	9	12 - 36	1 - 3
woolly Indianwheat	PLPA2	9	0 - 16	0 - 1	9	0 - 28	0 - 2	9	10 - 30	1 - 3	9	0 - 36	0 - 3
native forbs	2FN	9	16 - 80	1 - 5	9	14 - 70	1 - 5	9	10 - 50	1 - 5	9	0 - 24	0 - 2
SHRUBS		10	32 - 160	2 - 10	10	28 - 140	2 - 10	10	50 - 150	5 - 15	10	60 - 120	5 - 10
American plum	PRAM	10	0 - 48	0 - 3	10	0 - 28	0 - 2	10	0 - 10	0 - 1	10	0 - 24	0 - 2
cactus	OPUNT	10	0 - 32	0 - 2	10	0 - 70	0 - 5	10	10 - 100	1 - 10	10	0 - 60	0 - 5
chokecherry	PRVI	10	0 - 32	0 - 2	10	0 - 14	0 - 1						
creeping juniper	JUHO2	10	0 - 16	0 - 1	10	0 - 70	0 - 5	10	0 - 10	0 - 1	10	0 - 60	0 - 5
dwarf false indigo	AMNA	10	0 - 16	0 - 1	10	0 - 14	0 - 1	10	0 - 10	0 - 1	10	0 - 12	0 - 1
fringed sagewort	ARFR4	10	16 - 80	1 - 5	10	28 - 112	2 - 8	10	50 - 100	5 - 10	10	12 - 60	1 - 5
rose	ROSA5	10	16 - 48	1 - 3	10	0 - 70	0 - 5	10	0 - 50	0 - 5	10	0 - 60	0 - 5
skunkbush sumac	RHTR	10	0 - 32	0 - 2	10	0 - 70	0 - 5	10	0 - 50	0 - 5	10	0 - 60	0 - 5
snowberry	SYMPH	10	0 - 32	0 - 2	10	0 - 14	0 - 1						
yucca	YUGL	10	0 - 32	0 - 2	10	14 - 70	1 - 5	10	20 - 50	2 - 5	10	0 - 36	0 - 3
other shrubs	2SHRUB	10	0 - 80	0 - 5	10	0 - 70	0 - 5	10	0 - 50	0 - 5	10	0 - 60	0 - 5
TREES		11	0 - 32	0 - 2	11	0 - 14	0 - 1				11	60 - 180	5 - 15
eastern redcedar	JUVI	11	0 - 32	0 - 2	11	0 - 14	0 - 1				11	60 - 120	5 - 10
Rocky Mountain juniper	JUSC2	11	0 - 32	0 - 2	11	0 - 14	0 - 1				11	60 - 120	5 - 10
bur oak	QUMA2	11	0 - 32	0 - 2									
other trees	2TREE	11	0 - 32	0 - 2									
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH
GRASSES & GRASS-LIKES			895 - 1368 - 1835		640 - 1134 - 1625		510 - 775 - 1140		535 - 900 - 1265				
FORBS			75 - 120 - 165		135 - 175 - 215		45 - 125 - 205		55 - 90 - 125				
SHRUBS			30 - 96 - 165		25 - 84 - 145		45 - 100 - 155		55 - 90 - 125				
TREES			0 - 16 - 35		0 - 7 - 15				55 - 120 - 185				
TOTAL			1000 - 1600 - 2200		800 - 1400 - 2000								

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.

Bluestem/Grama/Wheatgrass/Needlegrass Plant Community

Interpretations are primarily based on the Bluestem/Grama/Wheatgrass/Needlegrass Plant Community, which is considered to be climax. Potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The major grasses include little bluestem, sideoats grama, western wheatgrass, and needleandthread. Other grasses and grass-likes occurring on this plant community include blue grama, hairy grama, buffalograss, and sedge. Forbs commonly occurring include purple coneflower, purple prairie clover, green sagewort, dotted gayfeather, cudweed sagewort, and scurfpea. Shrubs commonly occurring include fringed sagewort, plum, and rose.

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 properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Runoff from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

The following growth curve is an estimate of the monthly percentages of the annual growth of the dormant species expected during the normal 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:

- Continuous seasonal grazing (grazing the same area for the entire growing season at the same time of year every year) will convert the plant community to the *Western Wheatgrass/Grama/Forbs Plant Community*. Mid and tall warm-season grasses decrease, while western wheatgrass and short warm-season grasses blue grama and buffalograss increase.

Western Wheatgrass/Grama/Forbs Plant Community

This plant community develops under continuous seasonal grazing by large herbivores. The potential vegetation is about 70 percent grasses and grass-likes, 15 percent forbs, and 10 percent shrubs. The major grasses and grass-likes include western wheatgrass, blue grama, and sideoats grama. Other grasses occurring on this plant community include buffalograss, needleandthread, and sedges. Forbs

commonly occurring on this site include dotted gayfeather, cudweed sagewort, purple coneflower, and scurfpea. Shrubs commonly found include fringed sagewort, rose, and yucca.

When compared to the Bluestem/Grama/Wheatgrass/Needlegrass Plant Community, blue grama, and western wheatgrass have increased. The needlegrasses, little bluestem, and sideoats grama have decreased. This plant community is stable and protected from excessive erosion. 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. This plant community tends to be resilient if disturbance is not long-term.

The following growth curve is an estimate of the monthly percentages of the annual growth of the dormant species expected during the normal 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 leading to other plant communities are as follows:

- Continuous heavy grazing will shift this plant community to the *Grama/Sedge/Forbs Plant Community*.
- Prescribed grazing will move this plant community to the *Bluestem/Grama/Wheatgrass/Needlegrass Plant Community*.
- Nonuse, no fire, and encroachment will shift plant community toward a *Conifer/Deciduous* community. This occurs when this plant community is protected from natural fires or controlled burning.

Grama/Sedge/Forbs Plant Community

This plant community develops from long-term heavy grazing. This plant community can sometimes be found in small patches dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Diversity is lost, as shortgrasses become dominant in the plant community. Grazing tolerant blue grama and sedges have replaced the bluestems, western wheatgrass, and green needlegrass. Sideoats grama and needleandthread remain, but are less productive because of grazing pressure. Because of grazing pressure, threeawn, fringed sagewort, green sagewort, yucca, woolly Indianwheat, pussytoes, and cactus become more prevalent in the plant community.

This plant community is typically resistant to change. Generally, this plant community will require significant management inputs and time to move it away from this plant community. Onsite soil erosion is low. Infiltration is low, and runoff is high. Typically the runoff is very clean, but offsite areas can be significantly impacted due to the increased runoff. Continued overuse results in an increase of bare ground and higher erosion potential.

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

Transitional pathways leading to other plant communities are as follows:

- With long-term prescribed grazing, that includes changing season of use and allowing adequate recovery periods and/or prescribed burning will shift this plant community toward the *Bluestem/Grama/Wheatgrass/Needlegrass Plant Community*.
- Nonuse, no fire, and encroachment will shift plant community toward the *Conifer/Deciduous Plant Community*. This occurs when this plant community is protected from natural fires or controlled burning.

Conifer/Deciduous Plant Community

This plant community develops under nonuse, no fire, and encroachment by juniper. Juniper is currently expanding on this site due to suppression of fire. The juniper canopy is 15 percent. The understory is made up of 70-85 percent grasses and grass-like species and 5-10 percent forbs. Dominant grasses and grass-likes include western wheatgrass, blue grama, needleandthread, little bluestem, and sedges. As the canopy increases, warm-season grasses tend to decrease as the cool-season grasses initially increase. Forbs commonly found in this community include green sagewort, western yarrow, dotted gayfeather, and Indian breadroot. Nonnative species such as cheatgrass and bluegrass will tend to invade this plant community.

Compared to the Bluestem/Grama/Wheatgrass/Needlegrass Plant Community, juniper increases significantly. The grass component decreases dramatically as the buildup of juniper needles increases. Annual herbaceous production also decreases significantly. While the juniper canopy provides excellent protection from the weather for both livestock and wildlife, it is not capable of supporting large numbers of wildlife and livestock due to decreased production. A significant reduction of juniper/pine can be accomplished through timber harvest or crown fire. The vegetation in the understory is capable of enduring fire; however, very hot crown fires will have a detrimental effect to the plant community.

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: SD6311

Growth curve name: Pierre Shale Plains, heavy conifer canopy.

Growth curve description: Mature eastern redcedar overstory.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3	7	11	24	27	12	5	4	3	2	1

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

- Timber harvest and/or fire will move this plant community towards the *Bluestem/Grama/Wheatgrass/Needlegrass Plant Community*.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under development --

Bluestem/Grama/Wheatgrass/Needlegrass Plant Community:

Western Wheatgrass/Grama/Forbs Plant Community:

Grama/Sedge/Forbs Plant Community:

Conifer/Deciduous Plant Community:

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses & Grass-likes							
big bluestem	U D P D	U D U U	U D P D	U D U U	U D U U	U D P D	U D P D
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
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
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
hairy 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
little bluestem	U D D U	N D N N	U D D U	N D N N	N D N N	U D D U	U D D U
needleandthread	U U D U	N D N U	U U D U	N D N U	N D N U	U U D U	U U D U
needleleaf sedge	U U D U	U P N D	U U D U	U U D U	U U D U	U U D U	U U D U
plains muhly	U U D U	U U D U	U U D U	N N N N	N N N N	U U D U	U U D U
prairie junegrass	U U D U	N D N U	U U D U	N D N U	N D N U	U U D U	U U D U
prairie sandreed	U D U U	U U D U	U D U U	U U D U	U U D U	U D U U	U D U U
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 U D U	U P N D	U U D U	U U D U	U U D U	U U D U	U U D U
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 pasqueflower	N N N N	N U N N	N N N N	N U N N	N U N N	N N N N	N N N 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
bracted spiderwort	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
catclaw sensitive briar	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
cutweed 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
dalea	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
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
dotted gayfeather	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
erigonum	U U D U	U U U U	U U D U	U U U U	U U U U	U U D U	U U U U
false boneset	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
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
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
hairy goldaster	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
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
hoary puccoon	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
Indian breadroot	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
Lambert crazyweed	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
milkvetch	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
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
plains larkspur	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
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
prairie smoke	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
purple 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
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
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
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
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
stiff sunflower	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U	U D P U
tall breadroot	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 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
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 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
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							
American plum	D U U D	D U U D	D U U D	P U D D	D U U D	D U U D	D U U D
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
chokecherry	D T T D	D T T D	D T T D	P U D P	D U U D	D T T D	P U U P
creeping juniper	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U	U N N U
dwarf false indigo	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U	U P D U
fringed sagewort	U U U U	U U U U	U U U U	U U U U	U P P D	U U U U	U U U U
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
skunkbush sumac	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 U D
snowberry	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
yucca	D N N D	D U U D	D N N D	D U U D	D U U D	D N N D	D U U D
Trees							
eastern redcedar	U N N U	U N N U	U N N U	D U U D	U N N U	U N N U	U N N U
Rocky Mountain juniper	U N N U	U N N U	U N N U	D U U D	U N N U	U N N U	U N N U
bur oak	T T T T	T T T T	N N N N	N U D U	N N N N	T T T T	N U D U

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)
Bluestem/Grama/Wheatgrass/Needlegrass	1600	0.44
Western Wheatgrass/Grama/Forbs	1400	0.38
Grama/Sedge/Forbs	1000	0.27
Conifer/Deciduous	1200	0.33

*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 very slow to moderate 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. Dominance by blue grama and sedge will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

This site provides hunting, hiking, photography, bird watching, and other opportunities. The wide varieties of plants that bloom from spring until fall have an aesthetic value that appeals to visitors.

Wood Products

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

(063AY011SD) – Clayey (063AY012SD) – Thin Upland
(063AY017SD) – Shallow Clay (063AY018SD) – Dense Clay

Similar Sites

(063AY011SD) – Clayey [more green needlegrass, less sideoats grama; higher production]
(063AY017SD) – Shallow Clay [more green needlegrass and sideoats grama; less needleandthread]

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.

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
SCS-RANGE-417	0			

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 Type: Rangeland
MLRA: 63A – Northern Rolling Pierre Shale Plains

Shallow
R063AY024SD

Site Description Approval

SD, State Range Management Specialist

Date