

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Stony Hills

Site ID: R058DY029SD

Major Land Resource Area (MLRA): 58D – Northern Rolling High Plains, Eastern Part



Physiographic Features

This site occurs on moderately steep to steep uplands.

Landform: hillslope

Aspect: N/A

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	2,300	4,000
Slope (percent):	9	40
Water Table Depth (inches):	80	80
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	None	None
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	Medium

Climatic Features

The climate in this MLRA is typical of the drier portions of the Northern Great Plains where sagebrush steppes to the west yield to grassland to the east. Annual precipitation ranges from 14 to 16 inches. Most of the rainfall occurs as frontal storms early in the growing season. Some high intensity, convective thunderstorms occur in the summer. Precipitation in winter occurs as snow. Temperatures show a wide range between summer and winter and between daily maximums and minimums, due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Outbreaks of cold air from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring. The normal average annual temperature is about 44°F. January is the coldest month with average temperatures ranging from about 12°F (Marmarth, North Dakota (ND)), to about 20°F (Baker, Montana (MT)). July is the warmest month with temperatures averaging from about 70°F (Marmarth, ND), to about 76°F (Baker, MT). The range of normal average monthly temperatures between the coldest and warmest months is about 55°F. 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 strong storms may bring brief periods of high winds with gusts to more than 50

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

	<u>Minimum</u>	<u>Maximum</u>
Frost-free period (days):	110	123
Freeze-free period (days):	130	140
Mean Annual Precipitation (inches):	14	16

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

	Precip. Min.	Precip. Max	Temp. Min.	Temp. Max.
January	0.39	0.46	-0.8	31.0
February	0.34	0.54	5.7	34.4
March	0.73	0.82	15.7	43.8
April	1.23	1.73	29.1	60.4
May	2.29	2.71	39.6	67.7
June	2.79	3.00	49.3	76.7
July	1.91	2.10	54.5	90.7
August	1.35	1.46	50.2	88.2
September	1.16	1.25	40.1	76.5
October	0.85	1.07	28.9	59.5
November	0.43	0.57	15.9	44.6
December	0.31	0.50	6.1	33.7

Climate Stations		Period	
Station ID	Location or Name	From	To
MT0412	Baker	1948	2005
SD1294	Camp Crook	1896	2006
SD3560	Harding 3 SE	1951	2006
ND5575	Marmarth	1950	2006
SD7062	Redig 11 NE	1948	2006

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

Influencing Water Features

No significant water features influence this site.

Representative Soil Features

The soils in this site are well drained and formed in colluvium weathered from sandstone. The surface layer is three to five inches thick. The texture surface layer is very fine sandy loam, while the subsurface layers range from loam to sandy loam and are gravelly, very gravelly or very cobbly. The soils have a moderately rapid infiltration rate. The soils on this site are modified by cobbles and stones that occur in the profile and at the surface. This site should show slight to no evidence of rills or wind scoured areas. Plant pedestalling occurs occasionally, but no exposed roots should occur. Water flow paths are typically not present but when visible, they are broken and irregular in appearance or discontinuous. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive to water movement and root penetration. These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 20 percent. Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>) for specific local soils information.

Parent Material Kind: colluvium
 Parent Material Origin: sandstone
 Surface Texture: very fine sandy loam
 Surface Texture Modifier: none
 Subsurface Texture Group: sandy
 Surface Fragments ≤3” (% Cover): 0-5
 Surface Fragments >3” (%Cover): 0-5
 Subsurface Fragments ≤3” (% Volume): 40-65
 Subsurface Fragments >3” (% Volume): 10-55

	<u>Minimum</u>	<u>Maximum</u>
Drainage Class:	well	well
Permeability Class:	moderate	moderately rapid
Depth to Bedrock (inches):	40	80
Electrical Conductivity (mmhos/cm)*:	0	2
Sodium Absorption Ratio*:	0	0
Soil Reaction (1:1 Water)*:	6.1	8.4
Soil Reaction (0.1M CaCl2)*:	NA	NA
Available Water Capacity (inches)*:	5	5
Calcium Carbonate Equivalent (percent)*:	0	15

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

Plant Communities

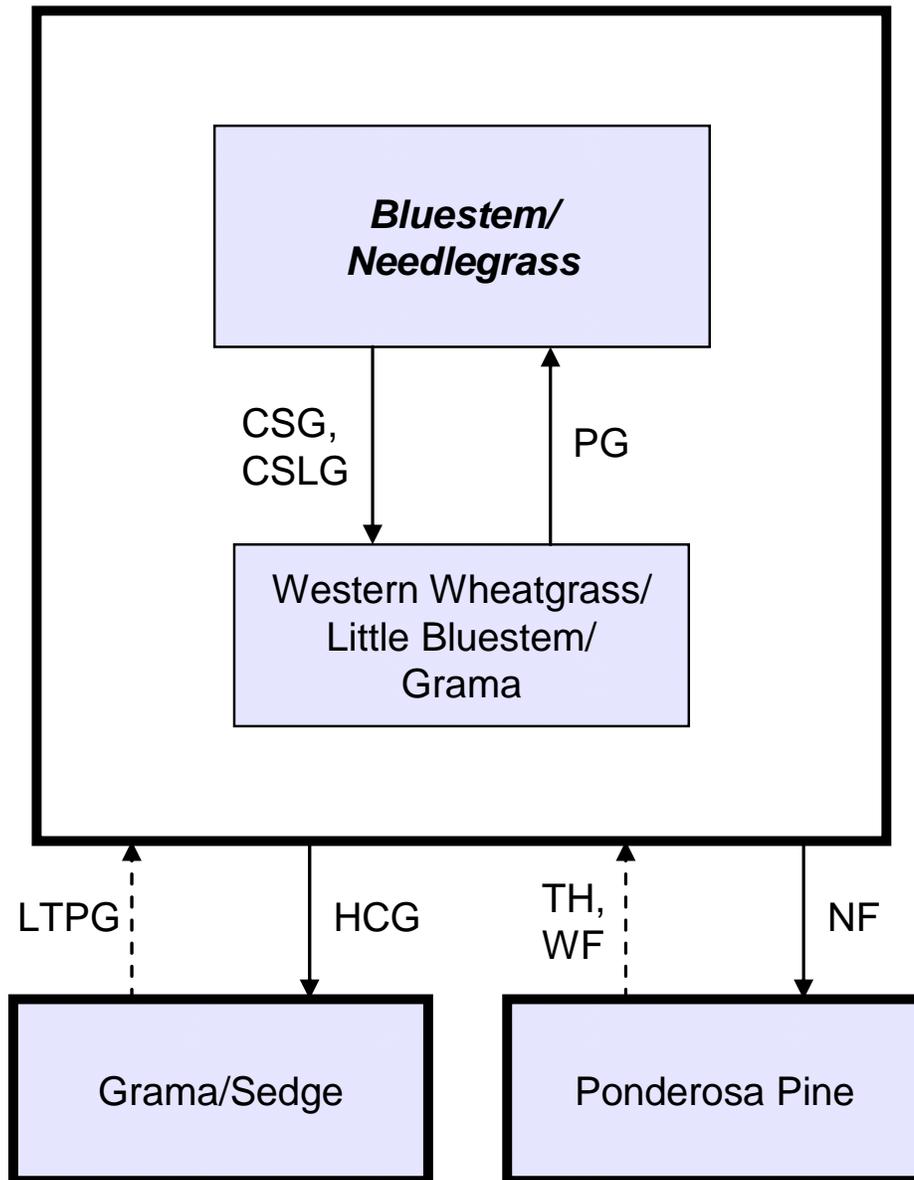
Ecological Dynamics of the Site

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

The plant community upon which interpretations are primarily based is the Bluestem/Needlegrass Plant Community. This plant community has been determined by studying rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience. Heavy continuous grazing and/or continuous seasonal (spring) grazing, without adequate recovery periods following each grazing occurrence causes this site to depart from the Bluestem/Needlegrass Plant Community. Blue grama will begin to increase. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate. This resulting plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the Bluestem/Needlegrass Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

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



CSG – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **CSLG** – Continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **NF** – No fire for multiple years; **PG** – Prescribed grazing (planned, controlled harvest of vegetation with grazing or browsing animals – see FOTG, Section IV, 528); **TH** – Timber harvest; **WF** - Wildfire.

Plant Community Composition and Group Annual Production

COMMON/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Bluestem/Needlegrass		
			Group	Ibs./acre	% Comp
GRASSES & GRASS-LIKES				1260 - 1530	70 - 85
MID WARM-SEASON GRASSES			1	360 - 630	20 - 35
little bluestem	Schizachyrium scoparium	SCSC	1	270 - 540	15 - 30
sideoats grama	Bouteloua curtipendula	BOCU	1	36 - 180	2 - 10
prairie dropseed	Sporobolus heterolepis	SPHE	1	18 - 144	1 - 8
TALL WARM-SEASON GRASSES			2	180 - 360	10 - 20
big bluestem	Andropogon gerardii	ANGE	2	180 - 360	10 - 20
COOL-SEASON BUNCHGRASSES			3	90 - 360	5 - 20
green needlegrass	Nassella viridula	NAVI4	3	36 - 270	2 - 15
needleandthread	Hesperostipa comata ssp. comata	HECOC8	3	36 - 180	2 - 10
porcupine grass	Hesperostipa spartea	HESP11	3	0 - 90	0 - 5
Canada wildrye	Elymus canadensis	ELCA4	3	0 - 90	0 - 5
WHEATGRASSES			4	90 - 180	5 - 10
western wheatgrass	Pascopyrum smithii	PASM	4	90 - 180	5 - 10
slender wheatgrass	Elymus trachycaulus	ELTR7	4	0 - 90	0 - 5
SHORT WARM-SEASON GRASSES			5	36 - 180	2 - 10
blue grama	Bouteloua gracilis	BOGR2	5	36 - 180	2 - 10
hairy grama	Bouteloua hirsuta	BOHI2	5	0 - 90	0 - 5
OTHER NATIVE GRASSES			6	18 - 90	1 - 5
prairie junegrass	Koeleria macrantha	KOMA	6	18 - 54	1 - 3
bottlebrush squirreltail	Elymus elymoides	ELEL5	6	0 - 36	0 - 2
other grasses		2GRAM	6	0 - 72	0 - 4
GRASS-LIKES			7	18 - 90	1 - 5
sedge	Carex spp.	CAREX	7	18 - 90	1 - 5
other grass-likes		2GL	7	0 - 54	0 - 3
FORBS			9	90 - 180	5 - 10
American pasqueflower	Pulsatilla patens ssp. multifida	PUPAM	9	18 - 36	1 - 2
catclaw sensitive brier	Mimosa nuttallii	MINU6	9	0 - 18	0 - 1
cudweed sagewort	Artemisia ludoviciana	ARLU	9	18 - 36	1 - 2
dotted gayfeather	Liatris punctata	LIPU	9	18 - 36	1 - 2
false boneset	Brickellia eupatorioides	BREU	9	18 - 36	1 - 2
goldenrod	Solidago spp.	SOLID	9	18 - 36	1 - 2
green sagewort	Artemisia campestris	ARCA12	9	0 - 18	0 - 1
milkvetch	Astragalus spp.	ASTRA	9	18 - 36	1 - 2
penstemon	Penstemon spp.	PENST	9	0 - 18	0 - 1
prairie clover	Dalea spp.	DALEA	9	18 - 36	1 - 2
prairie coneflower	Ratibida columnifera	RACO3	9	18 - 36	1 - 2
prairie smoke	Geum triflorum	GETR	9	0 - 18	0 - 1
purple coneflower	Echinacea angustifolia	ECAN2	9	18 - 36	1 - 2
pussytoes	Antennaria spp.	ANTEN	9	18 - 36	1 - 2
scarlet gaura	Gaura coccinea	GACO5	9	18 - 36	1 - 2
scurfpea	Psoraleum spp.	PSORA2	9	18 - 36	1 - 2
sego lily	Calochortus nuttallii	CANU3	9	0 - 18	0 - 1
spiny phlox	Phlox hoodii	PHHO	9	18 - 36	1 - 2
western ragweed	Ambrosia psilostachya	AMPS	9	18 - 36	1 - 2
western yarrow	Achillea millefolium var. occidentalis	ACMIO	9	0 - 18	0 - 1
white prairie aster	Symphotrichum falcatum	SYFA	9	18 - 36	1 - 2
native forbs		2FN	9	18 - 72	1 - 4
SHRUBS			10	90 - 180	5 - 10
creeping juniper	Juniperus horizontalis	JUHO2	10	0 - 18	0 - 1
dwarf false indigo	Amorpha nana	AMNA	10	18 - 36	1 - 2
fringed sagewort	Artemisia frigida	ARFR4	10	18 - 36	1 - 2
leadplant	Amorpha canescens	AMCA6	10	18 - 72	1 - 4
rose	Rosa spp.	ROSA5	10	18 - 36	1 - 2
skunkbush sumac	Rhus trilobata	RHTR	10	0 - 36	0 - 2
western snowberry	Symphoricarpos occidentalis	SYOC	10	18 - 36	1 - 2
yucca	Yucca glauca	YUGL	10	0 - 18	0 - 1
other shrubs		2SHRUB	10	0 - 54	0 - 3
TREES			11	36 - 180	2 - 10
ponderosa pine	Pinus ponderosa	PIPO	11	36 - 180	2 - 10
Rocky Mountain juniper	Juniperus scopulorum	JUSC2	11	0 - 90	0 - 5
other trees		2TREE	11	0 - 54	0 - 3

Annual Production lbs./acre	LOW	RV	HIGH
GRASSES & GRASS-LIKES	1095	1422	1800
FORBS	85	135	200
SHRUBS	85	135	200
TREES	35	108	200
TOTAL	1300	1800	2400

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/Needlegrass			Western Wheatgrass/ Little Bluestem/Grama			Grama/Sedge		
		Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp	Grp	lbs./acre	% Comp
GRASSES & GRASS-LIKES			1260 - 1530	70 - 85		980 - 1190	70 - 85		750 - 850	75 - 85
MID WARM-SEASON GRASSES		1	360 - 630	20 - 35	1	70 - 280	5 - 20	1	0 - 80	0 - 8
little bluestem	SCSC	1	270 - 540	15 - 30	1	70 - 210	5 - 15	1	0 - 50	0 - 5
sideoats grama	BOCU	1	36 - 180	2 - 10	1	0 - 112	0 - 8	1	0 - 60	0 - 6
prairie dropseed	SPHE	1	18 - 144	1 - 8	1	0 - 56	0 - 4			
TALL WARM-SEASON GRASSES		2	180 - 360	10 - 20	2	0 - 70	0 - 5	2		
big bluestem	ANGE	2	180 - 360	10 - 20	2	0 - 70	0 - 5			
COOL-SEASON BUNCHGRASSES		3	90 - 360	5 - 20	3	14 - 140	1 - 10	3	0 - 50	0 - 5
green needlegrass	NAV4	3	36 - 270	2 - 15	3	0 - 70	0 - 5			
needleandthread	HECOC8	3	36 - 180	2 - 10	3	14 - 98	1 - 7	3	0 - 50	0 - 5
porcupine grass	HESP11	3	0 - 90	0 - 5	3	0 - 28	0 - 2			
Canada wildrye	ELCA4	4	0 - 90	0 - 5	3	0 - 14	0 - 1			
WHEATGRASSES		4	90 - 180	5 - 10	4	140 - 280	10 - 20	4	0 - 50	0 - 5
western wheatgrass	PASM	4	90 - 180	5 - 10	4	140 - 280	10 - 20	4	0 - 50	0 - 5
slender wheatgrass	ELTR7	4	0 - 90	0 - 5	4	0 - 42	0 - 3			
SHORT WARM-SEASON GRASSES		5	36 - 180	2 - 10	5	70 - 210	5 - 15	5	200 - 400	20 - 40
blue grama	BOGR2	5	36 - 180	2 - 10	5	70 - 210	5 - 15	5	200 - 350	20 - 35
hairy grama	BOHI2	5	0 - 90	0 - 5	5	0 - 112	0 - 8	5	0 - 100	0 - 10
OTHER NATIVE GRASSES		6	18 - 90	1 - 5	6	14 - 70	1 - 5	6	10 - 50	1 - 5
prairie junegrass	KOMA	6	18 - 54	1 - 3	6	14 - 42	1 - 3	6	10 - 30	1 - 3
bottlebrush squirreltail	ELEL5	6	0 - 36	0 - 2	6	0 - 28	0 - 2	6	0 - 20	0 - 2
other grasses	2GRAM	6	0 - 72	0 - 4	6	0 - 56	0 - 4	6	0 - 40	0 - 4
GRASS-LIKES		7	18 - 90	1 - 5	7	28 - 140	2 - 10	7	100 - 250	10 - 25
sedge	CAREX	7	18 - 90	1 - 5	7	28 - 140	2 - 10	7	100 - 250	10 - 25
other grass-likes	2GL	7	0 - 54	0 - 3	7	0 - 42	0 - 3	7	0 - 30	0 - 3
NON-NATIVE GRASSES		8			8	0 - 70	0 - 5	8	10 - 100	1 - 10
bluegrass	POA	8			8	0 - 70	0 - 5	8	0 - 50	0 - 5
cheatgrass	BRTE	8			8	0 - 70	0 - 5	8	10 - 80	1 - 8
FORBS		9	90 - 180	5 - 10	9	70 - 140	5 - 10	9	20 - 70	2 - 7
American pasqueflower	PUPAM	9	18 - 36	1 - 2	9	0 - 14	0 - 1			
catclaw sensitive briar	MINU6	9	0 - 18	0 - 1						
cudweed sagewort	ARLU	9	18 - 36	1 - 2	9	14 - 42	1 - 3	9	10 - 30	1 - 3
dotted gayfeather	LIPU	9	18 - 36	1 - 2	9	0 - 28	0 - 2			
false boneset	BREU	9	18 - 36	1 - 2	9	0 - 14	0 - 1			
goldenrod	SOLID	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	10 - 20	1 - 2
green sagewort	ARCA12	9	0 - 18	0 - 1	9	0 - 28	0 - 2	9	0 - 20	0 - 2
milkvetch	ASTRA	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	10 - 20	1 - 2
penstemon	PENST	9	0 - 18	0 - 1						
prairie clover	DALEA	9	18 - 36	1 - 2	9	0 - 14	0 - 1			
prairie coneflower	RACO3	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	0 - 10	0 - 1
prairie smoke	GETR	9	0 - 18	0 - 1						
purple coneflower	ECAN2	9	18 - 36	1 - 2	9	0 - 14	0 - 1			
pussytoes	ANTEN	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	10 - 20	1 - 2
scarlet gaura	GACO5	9	18 - 36	1 - 2	9	0 - 14	0 - 1			
scurfpea	PSORA2	9	18 - 36	1 - 2	9	14 - 42	1 - 3	9	10 - 20	1 - 2
sego lily	CANU3	9	0 - 18	0 - 1						
spiny phlox	PHHO	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	10 - 20	1 - 2
western ragweed	AMPS	9	18 - 36	1 - 2	9	14 - 42	1 - 3	9	10 - 20	1 - 2
western yarrow	ACMIO	9	0 - 18	0 - 1	9	0 - 28	0 - 2	9	0 - 20	0 - 2
white prairie aster	SYFA	9	18 - 36	1 - 2	9	14 - 28	1 - 2	9	10 - 20	1 - 2
native forbs	2FN	9	18 - 72	1 - 4	9	14 - 70	1 - 5	9	10 - 40	1 - 4
introduced forbs	2FI				9	0 - 70	0 - 5	9	0 - 40	0 - 4
SHRUBS		10	90 - 180	5 - 10	10	70 - 140	5 - 10	10	50 - 100	5 - 10
creeping juniper	JUHO2	10	0 - 18	0 - 1	10	0 - 42	0 - 3	10	0 - 40	0 - 4
dwarf false indigo	AMNA	10	18 - 36	1 - 2	10	0 - 14	0 - 1			
fringed sagewort	ARFR4	10	18 - 36	1 - 2	10	14 - 56	1 - 4	10	10 - 60	1 - 6
leadplant	AMCA6	10	18 - 72	1 - 4	10	0 - 28	0 - 2			
rose	ROSA5	10	18 - 36	1 - 2	10	14 - 42	1 - 3	10	10 - 20	1 - 2
skunkbush sumac	RHTR	10	0 - 36	0 - 2	10	0 - 28	0 - 2	10	0 - 20	0 - 2
western snowberry	SYOC	10	18 - 36	1 - 2	10	0 - 28	0 - 2	10	0 - 20	0 - 2
yucca	YUGL	10	0 - 18	0 - 1	10	14 - 42	1 - 3	10	10 - 40	1 - 4
other shrubs	2SHRUB	10	0 - 54	0 - 3	10	0 - 42	0 - 3	10	0 - 30	0 - 3
TREES		11	36 - 180	2 - 10	11	28 - 140	2 - 10	11	20 - 100	2 - 10
ponderosa pine	PIPO	11	36 - 180	2 - 10	11	28 - 140	2 - 10	11	20 - 100	2 - 10
Rocky Mountain juniper	JUSC2	11	0 - 90	0 - 5	11	0 - 70	0 - 5	11	0 - 50	0 - 5
other trees	2TREE	11	0 - 54	0 - 3	11	0 - 42	0 - 3	11	0 - 30	0 - 3
Annual Production lbs./acre			LOW RV HIGH		LOW RV HIGH		LOW RV HIGH		LOW RV HIGH	
GRASSES & GRASS-LIKES			1095 - 1422 - 1800		745 - 1106 - 1335		525 - 820 - 1105			
FORBS			85 - 135 - 200		65 - 105 - 155		15 - 45 - 75			
SHRUBS			85 - 135 - 200		65 - 105 - 155		45 - 75 - 110			
TREES			35 - 108 - 200		25 - 84 - 155		15 - 60 - 110			
TOTAL			1300 - 1800 - 2400		900 - 1400 - 1800		600 - 1000 - 1400			

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 repeatable plant communities. The plant composition tables shown above have been developed from the best available knowledge at the time of this revision. As more information is collected, some of these plant community descriptions may be revised or removed, and new ones added. None of these plant communities should necessarily be thought of as “Desired Plant Communities (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/Needlegrass Plant Community

The plant community upon which interpretations are primarily based is the Bluestem/Needlegrass Plant Community. This is also considered to be climax. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and on areas receiving occasional short periods of deferment. The potential vegetation is about 70 to 85 percent grasses or grass-like plants, 5 to 10 percent forbs, 5 to 10 percent shrubs, and 2 to 10 percent trees. A mixture of cool- and warm-season grasses dominates the plant community. Major grasses include little bluestem, big bluestem, green needlegrass, and needleandthread. Other grasses and grass-like species include sideoats grama, western wheatgrass, blue grama, prairie dropseed, porcupine grass, Canada wildrye, and sedge. Significant forbs include American pasqueflower, dotted gayfeather, false boneset, prairie clover, prairie coneflower, purple coneflower, and scarlet gaura. Significant shrubs found in this plant community include leadplant, rose, skunkbush sumac, and western snowberry.

This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. 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.

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: SD5804

Growth curve name: Northern Rolling High 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 and/or community pathways leading away from this plant community phase are as follows:

- Continuous seasonal grazing (grazing at the same time of year every year for extended periods) or continuous season-long grazing will convert this plant community to the *Western Wheatgrass/Little Bluestem/Grama Plant Community*.

Western Wheatgrass/Little Bluestem/Grama Plant Community

This plant community develops under continuous seasonal grazing or continuous season-long grazing. Little bluestem, big bluestem, prairie dropseed, needleandthread, and green needlegrass

decrease in abundance and vigor. Western wheatgrass initially increases in this plant community phase. Blue grama and sedge increase, and non-native species invade the plant community.

Other significant grasses or grass-like species include porcupine grass, slender wheatgrass, hairy grama, prairie Junegrass, and bottlebrush squirreltail. Forbs commonly found in this plant community include cudweed sagewort, green sagewort, scurfpea, goldenrod, spiny phlox, western ragweed, and white prairie aster. Significant shrubs include fringed sagewort, creeping juniper, rose, and yucca. The potential vegetation is about 70 to 85 percent grasses or grass-like plants, 5 to 10 percent forbs, 5 to 10 percent shrubs, and 2 to 10 percent trees. Although production remains relatively high, little bluestem plants often become “wolfy,” and largely not grazed due to lower palatability.

This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. Also, certain species and/or classes of livestock will readily consume the little bluestem in any condition and result in a shift away from this plant community phase. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

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: SD5803

Growth curve name: Northern Rolling High 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 and/or community pathways leading away from this plant community phase are as follows:

- Heavy continuous grazing will convert the plant community to the *Grama/Sedge Plant Community*.
- Prescribed grazing will convert this plant community to the *Bluestem/Needlegrass Plant Community*.

Grama/Sedge Plant Community

This plant community is a result from heavy grazing over many years. Diversity is diminished, as the short grasses become dominant in the plant community. The grazing tolerant blue grama and sedges replace little bluestem, western wheatgrass, and the needlegrasses. Sideoats grama remains in the plant community, but is less productive because of competition and grazing pressure. Due to low palatability, cudweed sagewort, green sagewort, scurfpea, western ragweed, and western yarrow become more prevalent in the plant community. Fringed sagewort is the dominant shrub in this plant community. Other shrubs commonly found in this plant community include creeping juniper, yucca, and rose. The potential vegetation is about 75 to 85 percent grasses or grass-like plants, 2 to 7 percent forbs, 5 to 10 percent shrubs, and 5 to 10 percent trees.

This plant community is resistant to change. The herbaceous species present are less palatable and/or more grazing tolerant than the dominant species in the Bluestem/Needlegrass Plant Community. The dominant grass and grass-like species typically have short, compact rooting systems near the soil surface. This results in reduced infiltration and increased runoff. Onsite soil erosion may remain low, but the increased runoff may have damaging effects on adjacent ecological sites (ES).

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: SD5804

Growth curve name: Northern Rolling High 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 and/or community pathways leading away from this plant community phase are as follows:

- Long-term prescribed grazing that includes changing season of use and allowing adequate recovery periods will slowly lead this plant community back through successional stages that may eventually result in a plant community resembling the *Bluestem/Needlegrass Plant Community*.

Ponderosa Pine Plant Community

Historically, ponderosa pine made up about 10 percent of the Bluestem/Needlegrass Plant Community. This ES occurs between ponderosa pine woodlands higher on the landscape and herbaceous dominated rangeland lower on the landscape. This ES is somewhat transitional between the two. The pre-European fire frequencies kept ponderosa pine from dominating this site. Rocky Mountain juniper occurs in lesser amounts with the ponderosa pine. After many years with no fire, ponderosa pine begins to increase on this site and eventually dominates the plant community. Canopy cover begins to close and the understory diminishes to extremely low levels. Species present in minor amounts include needleandthread, prairie Junegrass, Canada wildrye, Kentucky bluegrass, cheatgrass, cudweed sagewort, green sagewort, pussytoes, spiny phlox, western snowberry, and fringed sagewort.

When compared to the Bluestem/Needlegrass Plant Community, ponderosa pine increases significantly. The grass component decreases dramatically as the buildup of pine and juniper needles increases. Annual production also decreases significantly. While the ponderosa pine 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.

This plant community is resistant to change. A significant reduction of ponderosa pine can only be accomplished through timber harvesting 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. Reclamation of ponderosa pine dominated areas can be costly and prove to be temporary without proper management (i.e., prescribed burning, and prescribed grazing).

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: SD5811

Growth curve name: Northern Rolling High Plains, heavy conifer canopy.

Growth curve description: Mature ponderosa pine/juniper 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

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

Major Land Resource Area (MLRA) 58D lies within the drier portion of Northern mixed-grass prairie ecosystem where sagebrush steppes to the west yield to grassland steppes to the east. Prior to European settlement, this area consisted of diverse grass/shrub land habitats interspersed with varying densities of depressional, in-stream wetlands, and woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds, small mammals, reptiles, amphibians, and herds of roaming bison, elk, and pronghorn were among the inhabitants adapted to this semi-arid region. Roaming herbivores, as well as, several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as the wolf, mountain lion, and grizzly bear, as well as, smaller carnivores such as the coyote, bobcat, fox, and raptors. The black-tailed prairie dog was once abundant; however, the species remains a keystone species within its range. The black-footed ferret, burrowing owl, ferruginous hawk, mountain plover, and swift fox were associated with prairie dog complexes.

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

Within MLRA 58D, the Stony Hills ES provides upland grassland cover with an associated forb and shrub component. It was typically part of an expansive grassland landscape that included combinations of Shallow Loamy, Shallow Clayey, Claypan, Thin Claypan, Sandy, Sandy Claypan, Loamy, and Clayey ESs. This site provided habitat for species requiring unfragmented grassland.

Important habitat features and components found commonly or exclusively on this site may include coniferous forest habitat; sharp-tailed grouse leks; upland nesting habitat for grassland birds, forbs, and insects for brood habitat; and a forage source for small and large herbivores. Many grassland and shrub steppe nesting bird populations are declining. Extirpated species include free-ranging bison, grizzly bear, gray wolf, black-footed ferret, mountain plover, Rocky Mountain locust, and swift fox.

The majority of the Stony Hills ES remains intact and provides increasingly important habitat for conifer dwelling species, grassland and shrub steppe nesting birds, small rodents, coyotes, and a variety of reptiles, amphibians, and insects. Changes in historic fire regime and domestic grazing have impacted the forb/shrub/tree/grass percentages.

Bluestem/Needlegrass and Western Wheatgrass/Little Bluestem/Grama: The predominance of grasses plus high diversity of forbs and high abundance of shrubs and increased presence of evergreen tree species in this community favors grazers and mixed-feeders, such as deer and pronghorn. Insects, such as pollinators, play a large role in maintaining the forb community and provide a forage base for grassland birds and other species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Grassland nesting birds and sharp-tailed grouse may be present. Woodland dwelling birds such as red-headed woodpecker, sapsuckers, phoebes, western wood-pewee, vireos, nuthatches, thrushes, and grosbeaks may be

present in lesser numbers. Diverse prey populations are available for raptors such as ferruginous hawk, Swainson's hawk, golden eagle, and prairie falcon.

The diversity of grasses, forbs, and shrubs provide high nutrition levels for small and large herbivores including voles, mice, thirteen-lined ground squirrel, white-tailed jackrabbit, and deer. The higher stature of this plant community provides thermal, protective, and escape cover for herbivores and grassland birds. Mammals such as bobcats, porcupines, mountain lions, and various bat species may be present and benefit from the structure and composition this plant community provides. Other predators utilizing this plant community include coyote, American badger, red fox, and long-tailed weasel. This plant community provides habitat for herptiles such as the spade foot toad, bull snake, and western rattlesnake.

The plant community shifts to a western wheatgrass, little bluestem, and grama community under continuous seasonal grazing and a low fire frequency. However, there is no substantial shift in the wildlife community.

Grama/Sedge: This plant community results from heavy, continuous grazing later in the growing season and a low fire frequency. Grama species (e.g., blue and hairy) and various sedge species will dominate. Forb and shrub species diversity and abundance are substantially reduced. Species such as horned lark, long-billed curlew, upland sandpiper, and white-tailed jackrabbit may be present. The shorter stature of this plant community limits suitable thermal, protective, and escape cover. Other predators utilizing this plant community include the coyote, American badger, red fox, and long-tailed weasel.

Extreme impairment of the ecological processes impacts offsite aquatic habitats through excessive runoff, nutrient, and sediment loads. Elevated surface temperatures resulting from reduced cover and litter will greatly reduce habitat for most amphibian species, grassland birds, and mammals.

Ponderosa Pine: Resulting from no fire for multiple years, the plant community is dominated by ponderosa pine with lesser amounts of Rocky Mountain juniper species. Due to the buildup of pine and juniper needles and closing of the forest canopy, understory vegetation is significantly limited. Grassland nesting birds and their associated predators are substantially reduced. Woodland dwelling birds such as red-headed woodpecker, sapsuckers, phoebes, western wood-pewee, vireos, nuthatches, thrushes, and grosbeaks may be present in lesser numbers. Mammals such as bobcats, porcupines, mountain lions, and various bat species may be common and benefit from the structure and composition this plant community provides. Other predators utilizing this plant community include coyote, red fox, and long-tailed weasel.

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

Common Name	Cattle	Sheep	Horses	Deer	Antelope	Bison	Elk
Grasses and 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
bottlebrush squirreltail	U D U U	N D U N	U D U U	N D U N	N D U N	U D U U	U D U U
Canada wildrye	U D U U	N U N N	U D U U	N U N N	N U N N	U D U U	U D U 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
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 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
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 dropseed	N U P U	N U D U	N U P U	N U D U	N U D U	N U P U	N U P U
prairie junegrass	U D U D	N D N U	U D U D	N D N U	N D N U	U D U D	U D U D
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
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
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
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
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
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
milkvetch	U U U U	U D U U	U U U U	U D U U	U D U U	U U U U	U D U U
penstemon	U U U U	U P P U	U U U U	U P P U	U P P U	U U U U	U P P U
prairie 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
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
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
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
sego lily	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
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
western ragweed	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
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
Shrubs and Trees							
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 D D U	U P P D	U U U U	U U U D
leadplant	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
ponderosa pine	U T T U	U N N U	U N N U	U N N U	U N N U	U T T 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
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
western snowberry	U U U U	U U U U	U U U U	D U D D	U U U U	U U U U	D 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

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

As this site improves in condition through proper management (from the more short grass dominated plant communities to the interpretive plant community), the advantage for livestock production includes: higher forage production from cool-season grasses, improved early spring forage production, and higher water infiltration. The disadvantage for livestock include: reduction in cool-/warm-season grass mix which would provides better management flexibility, less plant diversity, and a potential increase in soil erosion. The Grama/Sedge Plant Community is of limited value for livestock production.

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 B. 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 exception would be where shortgrasses form a strong sod and dominate the site. Normally, areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

Ponderosa pine often does not occupy this site in amounts extensive enough to make timber harvest practical, and this site is not typically productive for tree species. Timber harvest may be a practical approach if the site is being reclaimed for livestock production.

Other Products

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

Supporting Information

Associated Sites

Thin Loamy (R058DY012SD), Sandy (R058DY009SD), Thin Sandy (R058DY026SD), Shallow Loamy (R058DY024SD)

Similar Sites

(R058DY010SD) – Thin Sandy [prairie sandreed and sand bluestem present]
(R058DY024SD) – Shallow Loamy [less little bluestem; less production]
(R058DY028SD) – Shallow Sandy [more prairie sandreed, less production]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations and experience were also used. Those involved in developing this site description include: Stan Boltz, Range Management Specialist, NRCS.

State Correlation

This site has been correlated between MT, ND, and South Dakota (SD) in MLRA 58D.

Field Offices

Baker, MT (Fallon County)

Belle Fourche, SD (Butte County)

Bowman, ND (Bowman and Slope Counties)

Buffalo, SD (Harding County)

Ekalaka, MT (Carter County)

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 43e – Sagebrush Steppe.

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

MT, State Range Management Specialist

Date

ND, State Range Management Specialist

Date

SD, State Range Management Specialist

Date