

United States Department of Agriculture Natural Resources Conservation Service

Ecological Site Description

Site Type: Rangeland

Site Name: Limy Subirrigated

Site ID: R053CY006SD

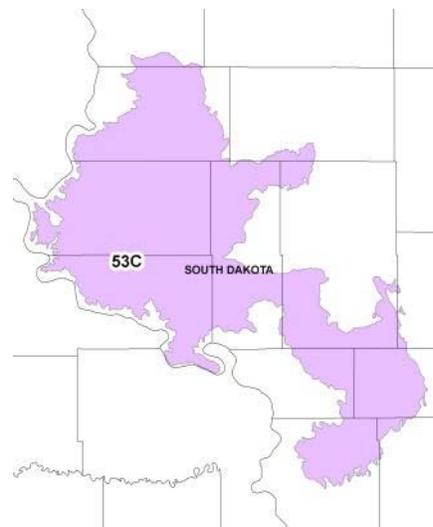
Major Land Resource Area (MLRA): 53C – Southern Dark Brown Glaciated Plains

Physiographic Features

This site occurs on nearly level lowlands or pothole rims.

Landform: floodplain, pothole, swale

Aspect: N/A



| | <u>Minimum</u> | <u>Maximum</u> |
|------------------------------------|----------------|----------------|
| Elevation (feet): | 1,300 | 2,300 |
| Slope (percent): | 0 | 1 |
| Water Table Depth (inches): | 33 | 48 |
| Flooding: | | |
| Frequency: | None | None |
| Duration: | None | None |
| Ponding: | | |
| Depth (inches): | None | None |
| Frequency: | None | None |
| Duration: | None | None |
| Runoff Class: | Negligible | Low |

Climatic Features

MLRA 53C is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the Northern Great Plains and air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation typically ranges from 18 to 22 inches per year. The average annual temperature is about 45°F. January is the coldest month with average temperatures ranging from about 15°F (Stephan, South Dakota (SD)), to about 16°F (Onida 4 NW, SD). July is the warmest month with temperatures averaging from about 72°F (Stephan, SD), to about 74°F (Onida 4 NW, 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 12 miles per hour (mph) annually, ranging from about 13 mph during the spring to about 11 mph during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

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

| | <u>Minimum</u> | <u>Maximum</u> |
|--|----------------|----------------|
| Frost-free period (days): | 125 | 141 |
| Freeze-free period (days): | 142 | 160 |
| Mean Annual Precipitation (inches): | 18 | 22 |

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

| | Precip. Min. | Precip. Max | Temp. Min. | Temp. Max. |
|-----------|---------------------|--------------------|-------------------|-------------------|
| January | 0.25 | 0.56 | 3.6 | 26.4 |
| February | 0.37 | 0.57 | 7.8 | 30.9 |
| March | 1.02 | 1.04 | 19.5 | 43.1 |
| April | 1.68 | 3.01 | 31.0 | 58.7 |
| May | 2.68 | 3.35 | 42.6 | 70.1 |
| June | 3.17 | 3.41 | 53.3 | 79.1 |
| July | 2.50 | 3.34 | 58.7 | 88.7 |
| August | 1.73 | 2.06 | 56.8 | 87.6 |
| September | 1.94 | 2.48 | 47.3 | 77.3 |
| October | 1.35 | 1.67 | 33.7 | 62.3 |
| November | 0.52 | 0.77 | 20.8 | 42.4 |
| December | 0.21 | 0.34 | 8.5 | 31.2 |

| Climate Stations | | Period | |
|-------------------------|-------------------------|---------------|-----------|
| Station ID | Location or Name | From | To |
| SD3608 | Harrold 12 SSW | 1963 | 2008 |
| SD6292 | Onida 4 NW | 1913 | 2008 |
| SD7992 | Stephan | 1903 | 2008 |
| SD9077 | Wessington Springs 7 SW | 1948 | 1998 |

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

Riparian and Wetland Features

This site has a persistent water table which strongly influences the production of the site but does not influence the species present greatly. Most of the dominant species are typical upland plants.

Representative Soil Features

These are very deep, moderately well-drained, coarse to medium textured soils. These soils have a calcareous subsoil. Permeability is moderately slow and available water capacity is moderate to high. Salinity is none to slight. Soils on this site are somewhat susceptible to wind erosion. This site is on flats, potholes, and swales on outwash plains and floodplains. Slope ranges from zero to one percent. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. No water flow paths are seen on this site. The soil surface is stable and intact. Subsurface soil layers are nonrestrictive to water movement and root penetration.

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

Parent Material Kind: loamy till
Parent Material Origin:
Surface Texture: loam
Surface Texture Modifier: none
Subsurface Texture Group: loam
Surface Fragments ≤3” (% Cover): 0-0
Surface Fragments >3” (%Cover): 0-0
Subsurface Fragments ≤3” (% Volume): 4
Subsurface Fragments >3” (% Volume): 0-2

| | <u>Minimum</u> | <u>Maximum</u> |
|---|-----------------|-----------------|
| Drainage Class: | moderately well | moderately well |
| Permeability Class: | moderately slow | moderately slow |
| Depth (inches): | 80 | 80 |
| Electrical Conductivity (mmhos/cm)*: | 0 | 4 |
| Sodium Absorption Ratio*: | 0 | 2 |
| Soil Reaction (1:1 Water)*: | 6.6 | 8.4 |
| Soil Reaction (0.1M CaCl ₂)*: | NA | NA |
| Available Water Capacity (inches)*: | 7 | 7 |
| Calcium Carbonate Equivalent (percent)*: | 5 | 20 |

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

Plant Communities

Ecological Dynamics of the Site

This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions 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. As this site deteriorates, species such as Kentucky bluegrass and smooth brome will increase. Warm-season grasses such as Indiangrass and big bluestem will decrease in frequency and production.

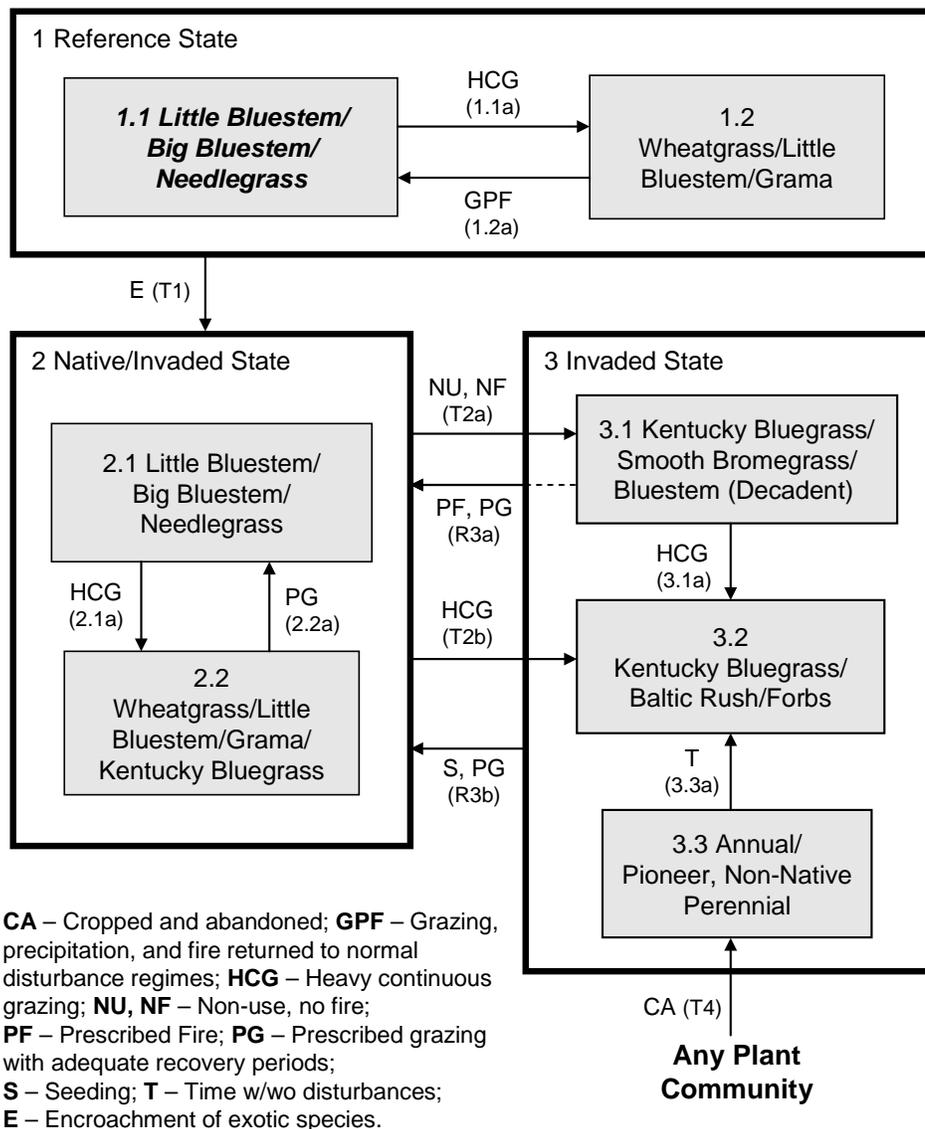
The presence of “free lime” calcium carbonate (CaCO₃) distinguishes the limy subirrigated ecological site from the Subirrigated Ecological Site (ES). Native vegetation has varied tolerance and response to calcium carbonate. Plants such as big bluestem, little bluestem, and needlegrasses have a high tolerance for calcium carbonate, while a species such as switchgrass have a very low tolerance. The result is an expression of big bluestem, little bluestem, and needlegrasses with a decrease in switchgrass and smooth brome compared to the Subirrigated ES. Carbonates near the surface of the soil tightly bind micronutrients making them less available to plants and creating plant-level deficiencies of some nutrients. As a consequence, native species, which are better adapted to environmental stress tolerance, continue to occupy the site and exotic species that generally exploit deep and nutrient-rich soils (such as smooth brome) are less-likely to invade.

Interpretations are primarily based on the 1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase. 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. Subclimax plant communities, states, transitional pathways,

and thresholds have been determined through similar studies and experience. Following the state and transition diagram are narratives for each of the described states and community phases. These may not represent every possibility but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best available knowledge at the time of this revision. As more data is collected, some of these community phases and/or states may be revised or removed and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

The following is a diagram that illustrates the common plant community phases that can occur on the site and the transition pathways between communities. These are the most common plant community phases based on current knowledge and experience and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

Plant Communities and Transitional Pathways



Plant Community Composition and Group Annual Production

| | | | 1.1 Little Bluestem/Big Bluestem/ Needlegrass | | |
|----------------------------------|---|--------|--|-------------|---------|
| COMMON/GROUP NAME | SCIENTIFIC NAME | SYMBOL | Group | lbs./acre | % Comp |
| GRASSES & GRASS-LIKES | | | | 3400 - 3800 | 85 - 95 |
| MID WARM-SEASON GRASSES | | | 1 | 800 - 1600 | 20 - 40 |
| little bluestem | Schizachyrium scoparium | SCSC | 1 | 600 - 1200 | 15 - 30 |
| sideoats grama | Bouteloua curtipendula | BOCU | 1 | 80 - 400 | 2 - 10 |
| TALL WARM-SEASON GRASSES | | | 2 | 400 - 1000 | 10 - 25 |
| big bluestem | Andropogon gerardii | ANGE | 2 | 200 - 800 | 5 - 20 |
| Indiangrass | Sorghastrum nutans | SONU2 | 2 | 80 - 400 | 2 - 10 |
| switchgrass | Panicum virgatum | PAVI2 | 2 | 40 - 400 | 1 - 10 |
| tall dropseed | Sporobolus compositus var. compositus | SPCOC2 | 2 | 0 - 200 | 0 - 5 |
| COOL-SEASON BUNCHGRASSES | | | 3 | 200 - 600 | 5 - 15 |
| green needlegrass | Nassella viridula | NAVI4 | 3 | 80 - 600 | 2 - 15 |
| porcupine grass | Hesperostipa spartea | HESP11 | 3 | 80 - 600 | 2 - 15 |
| Canada wildrye | Elymus canadensis | ELCA4 | 3 | 40 - 200 | 1 - 5 |
| WHEATGRASS | | | 4 | 200 - 400 | 5 - 10 |
| western wheatgrass | Pascopyrum smithii | PASM | 4 | 80 - 400 | 2 - 10 |
| slender wheatgrass | Elymus trachycaulus | ELTR7 | 4 | 80 - 400 | 2 - 10 |
| SHORT WARM-SEASON GRASSES | | | 5 | 80 - 320 | 2 - 8 |
| blue grama | Bouteloua gracilis | BOGR2 | 5 | 40 - 200 | 1 - 5 |
| witchgrass | Panicum capillare | PACA6 | 5 | 40 - 120 | 1 - 3 |
| inland saltgrass | Distichlis spicata | DISP | 5 | 0 - 80 | 0 - 2 |
| OTHER NATIVE GRASSES | | | 6 | 40 - 200 | 1 - 5 |
| Scribner panicum | Dichanthelium oligosanthes var. scribnerianum | DIOLS | 6 | 40 - 120 | 1 - 3 |
| other grasses | | 2GRAM | 6 | 0 - 200 | 0 - 5 |
| GRASS-LIKES | | | 7 | 80 - 400 | 2 - 10 |
| sedge | Carex spp. | CAREX | 7 | 80 - 320 | 2 - 8 |
| rush | Juncus spp. | JUNCU | 7 | 0 - 80 | 0 - 2 |
| other grass-likes | | 2GL | 7 | 0 - 80 | 0 - 2 |
| FORBS | | | 9 | 200 - 400 | 5 - 10 |
| American licorice | Glycyrrhiza lepidota | GLLE3 | 9 | 40 - 80 | 1 - 2 |
| aster | Aster spp. | ASTER | 9 | 40 - 80 | 1 - 2 |
| blue lettuce | Lactuca tatarica | LATA | 9 | 0 - 40 | 0 - 1 |
| cinquefoil | Potentilla spp. | POTEN | 9 | 40 - 80 | 1 - 2 |
| cudweed sagewort | Artemisia ludoviciana | ARLU | 9 | 40 - 80 | 1 - 2 |
| dotted gayfeather | Liatris punctata | LIPU | 9 | 40 - 80 | 1 - 2 |
| false gromwell | Onosmodium molle | ONMO | 9 | 0 - 80 | 0 - 2 |
| Flodman's thistle | Cirsium flodmanii | CIFL | 9 | 0 - 40 | 0 - 1 |
| goldenrod | Solidago spp. | SOLID | 9 | 40 - 80 | 1 - 2 |
| groundsel | Senecio spp. | SENEC | 9 | 0 - 40 | 0 - 1 |
| heartleaf Alexanders | Zizia aptera | ZIAP | 9 | 0 - 40 | 0 - 1 |
| heath aster | Symphyotrichum ericoides | SYER | 9 | 40 - 80 | 1 - 2 |
| horsetail | Equisetum laevigatum | EQLA | 9 | 0 - 40 | 0 - 1 |
| Maximilian sunflower | Helianthus maximiliani | HEMA2 | 9 | 40 - 80 | 1 - 2 |
| meadow anemone | Anemone canadensis | ANCA8 | 9 | 0 - 40 | 0 - 1 |
| Nuttall's violet | Viola nuttallii | VINU2 | 9 | 0 - 40 | 0 - 1 |
| prairie coneflower | Ratibida columnifera | RACO3 | 9 | 40 - 80 | 1 - 2 |
| silverleaf scurfpea | Pediomelum argophyllum | PEAR6 | 9 | 40 - 80 | 1 - 2 |
| sunflower | Helianthus spp. | HELIA3 | 9 | 0 - 80 | 0 - 2 |
| western ragweed | Ambrosia psilostachya | AMPS | 9 | 40 - 80 | 1 - 2 |
| western yarrow | Achillea millefolium var. occidentalis | ACMIO | 9 | 40 - 80 | 1 - 2 |
| native forbs | | 2FN | 9 | 40 - 120 | 1 - 3 |
| SHRUBS | | | 10 | 80 - 200 | 2 - 5 |
| rose | Rosa spp. | ROSA5 | 10 | 40 - 80 | 1 - 2 |
| snowberry | Symphoricarpos spp. | SYMPH | 10 | 40 - 120 | 1 - 3 |
| other shrubs | | 2SHRUB | 10 | 0 - 80 | 0 - 2 |

| Annual Production lbs./acre | LOW | RV | HIGH |
|----------------------------------|------|------|------|
| GRASSES & GRASS-LIKES | 2950 | 3560 | 4100 |
| FORBS | 175 | 300 | 475 |
| SHRUBS | 75 | 140 | 225 |
| TOTAL | 3200 | 4000 | 4800 |

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 | 1.1 Little Bluestem/Big Bluestem/Needlegrass | | | 2.2 Wheatgrass/Little Bluestem/ Grama/Kentucky Bluegrass | | | 3.1 Kentucky Bluegrass/Smooth Bromegrass/Bluestem (Decadent) | | | 3.2 Kentucky Bluegrass/ Baltic Rush/Forbs | | |
|------------------------------------|--------|--|--------------------|---------|--|-------------|--------------------|--|--------------------|---------|---|-------------|-------------|
| | | Grp | lbs./acre | % Comp | Grp | lbs./acre | % Comp | Grp | lbs./acre | % Comp | Grp | lbs./acre | % Comp |
| GRASSES & GRASS-LIKES | | | 3400 - 3800 | 85 - 95 | | 2320 - 2610 | 80 - 90 | | 2975 - 3325 | 85 - 95 | | 1760 - 1980 | 80 - 90 |
| MID WARM-SEASON GRASSES | | 1 | 800 - 1600 | 20 - 40 | 1 | 435 - 725 | 15 - 25 | 1 | 0 - 525 | 0 - 15 | 1 | 0 - 110 | 0 - 5 |
| little bluestem | SCSC | 1 | 600 - 1200 | 15 - 30 | 1 | 290 - 580 | 10 - 20 | 1 | 0 - 525 | 0 - 15 | 1 | 0 - 110 | 0 - 5 |
| sideoats grama | BOCU | 1 | 80 - 400 | 2 - 10 | 1 | 145 - 435 | 5 - 15 | 1 | 0 - 175 | 0 - 5 | 1 | 0 - 66 | 0 - 3 |
| TALL WARM-SEASON GRASSES | | 2 | 400 - 1000 | 10 - 25 | 2 | 145 - 435 | 5 - 15 | 2 | 0 - 350 | 0 - 10 | 2 | 0 - 110 | 0 - 5 |
| big bluestem | ANGE | 2 | 200 - 800 | 5 - 20 | 2 | 58 - 290 | 2 - 10 | 2 | 0 - 245 | 0 - 7 | | | |
| Indiangrass | SONU2 | 2 | 80 - 400 | 2 - 10 | 2 | 0 - 87 | 0 - 3 | 2 | 0 - 70 | 0 - 2 | | | |
| switchgrass | PAV12 | 2 | 40 - 400 | 1 - 10 | 2 | 0 - 87 | 0 - 3 | 2 | 0 - 70 | 0 - 2 | 2 | 0 - 22 | 0 - 1 |
| tall dropseed | SPCOC2 | 2 | 0 - 200 | 0 - 5 | 2 | 29 - 203 | 1 - 7 | 2 | 0 - 175 | 0 - 5 | 2 | 0 - 110 | 0 - 5 |
| COOL-SEASON BUNCHGRASSES | | 3 | 200 - 600 | 5 - 15 | 3 | 0 - 145 | 0 - 5 | 3 | 0 - 350 | 0 - 10 | 3 | | |
| green needlegrass | NAV14 | 3 | 80 - 600 | 2 - 15 | 3 | 0 - 145 | 0 - 5 | 3 | 0 - 280 | 0 - 8 | | | |
| porcupine grass | HESP11 | 3 | 80 - 600 | 2 - 15 | 3 | 0 - 116 | 0 - 4 | 3 | 0 - 70 | 0 - 2 | | | |
| Canada wildrye | ELCA4 | 3 | 40 - 200 | 1 - 5 | 3 | 0 - 58 | 0 - 2 | 3 | 0 - 105 | 0 - 3 | | | |
| WHEATGRASS | | 4 | 200 - 400 | 5 - 10 | 4 | 290 - 580 | 10 - 20 | 4 | 0 - 175 | 0 - 5 | 4 | | |
| western wheatgrass | PASM | 4 | 80 - 400 | 2 - 10 | 4 | 290 - 580 | 10 - 20 | 4 | 0 - 175 | 0 - 5 | | | |
| slender wheatgrass | ELTR7 | 4 | 80 - 400 | 2 - 10 | 4 | 0 - 145 | 0 - 5 | 4 | 0 - 175 | 0 - 5 | | | |
| SHORT WARM-SEASON GRASSES | | 5 | 80 - 320 | 2 - 8 | 5 | 145 - 435 | 5 - 15 | 5 | 0 - 245 | 0 - 7 | 5 | 0 - 220 | 0 - 10 |
| blue grama | BOGR2 | 5 | 40 - 200 | 1 - 5 | 5 | 87 - 348 | 3 - 12 | 5 | 0 - 105 | 0 - 3 | 5 | 0 - 154 | 0 - 7 |
| witchgrass | PACA6 | 5 | 40 - 120 | 1 - 3 | 5 | 29 - 145 | 1 - 5 | 5 | 0 - 105 | 0 - 3 | 5 | 0 - 110 | 0 - 5 |
| inland saltgrass | DISP | 5 | 0 - 80 | 0 - 2 | 5 | 0 - 87 | 0 - 3 | 5 | 0 - 70 | 0 - 2 | 5 | 0 - 66 | 0 - 3 |
| OTHER NATIVE GRASSES | | 6 | 40 - 200 | 1 - 5 | 6 | 29 - 145 | 1 - 5 | 6 | 35 - 175 | 1 - 5 | 6 | 22 - 110 | 1 - 5 |
| Scribner panicum | DIOLS | 6 | 40 - 120 | 1 - 3 | 6 | 29 - 58 | 1 - 2 | 6 | 0 - 70 | 0 - 2 | 6 | 22 - 44 | 1 - 2 |
| other grasses | ZGRAM | 6 | 0 - 200 | 0 - 5 | 6 | 0 - 145 | 0 - 5 | 6 | 35 - 175 | 1 - 5 | 6 | 0 - 110 | 0 - 5 |
| GRASS-LIKES | | 7 | 80 - 400 | 2 - 10 | 7 | 145 - 290 | 5 - 10 | 7 | 70 - 280 | 2 - 8 | 7 | 22 - 440 | 1 - 20 |
| sedge | CAREX | 7 | 80 - 320 | 2 - 8 | 7 | 87 - 290 | 3 - 10 | 7 | 35 - 175 | 1 - 5 | 7 | 0 - 110 | 0 - 5 |
| rush | JUNCU | 7 | 0 - 80 | 0 - 2 | 7 | 29 - 145 | 1 - 5 | 7 | 35 - 175 | 1 - 5 | 7 | 22 - 330 | 1 - 15 |
| other grass-likes | ZGL | 7 | 0 - 80 | 0 - 2 | 7 | 0 - 87 | 0 - 3 | 7 | 0 - 70 | 0 - 2 | 7 | 0 - 44 | 0 - 2 |
| NON-NATIVE GRASSES | | 8 | | | 8 | 145 - 435 | 5 - 15 | 8 | 875 - 1750 | 25 - 50 | 8 | 770 - 1320 | 35 - 60 |
| Kentucky bluegrass | POPR | | | | 8 | 58 - 435 | 2 - 15 | 8 | 700 - 1400 | 20 - 40 | 8 | 550 - 1100 | 25 - 50 |
| quackgrass | ELRE4 | | | | 8 | 0 - 290 | 0 - 10 | 8 | 0 - 175 | 0 - 5 | 8 | 110 - 440 | 5 - 20 |
| smooth bromegrass | BRIN2 | | | | 8 | 0 - 87 | 0 - 3 | 8 | 175 - 700 | 5 - 20 | 8 | 0 - 176 | 0 - 8 |
| FORBS | | 9 | 200 - 400 | 5 - 10 | 9 | 145 - 435 | 5 - 15 | 9 | 175 - 350 | 5 - 10 | 9 | 220 - 440 | 10 - 20 |
| American licorice | GLLE3 | 9 | 40 - 80 | 1 - 2 | 9 | 0 - 58 | 0 - 2 | 9 | 0 - 35 | 0 - 1 | | | |
| aster | ASTER | 9 | 40 - 80 | 1 - 2 | 9 | 0 - 58 | 0 - 2 | 9 | 35 - 140 | 1 - 4 | 9 | 0 - 88 | 0 - 4 |
| blue lettuce | LATA | 9 | 0 - 40 | 0 - 1 | | | | 9 | 0 - 35 | 0 - 1 | | | |
| cinquefoil | POTEN | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 58 | 1 - 2 | 9 | 0 - 70 | 0 - 2 | 9 | 0 - 22 | 0 - 1 |
| cudweed sagewort | ARLU | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 87 | 1 - 3 | 9 | 35 - 105 | 1 - 3 | 9 | 22 - 132 | 1 - 6 |
| dotted gayfeather | LIPU | 9 | 40 - 80 | 1 - 2 | 9 | 0 - 58 | 0 - 2 | 9 | 0 - 35 | 0 - 1 | | | |
| false gromwell | ONMO | 9 | 0 - 80 | 0 - 2 | 9 | 0 - 29 | 0 - 1 | | | | | | |
| Flodman's thistle | CIFL | 9 | 0 - 40 | 0 - 1 | 9 | 0 - 58 | 0 - 2 | 9 | 0 - 35 | 0 - 1 | 9 | 0 - 44 | 0 - 2 |
| goldenrod | SOLID | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 174 | 1 - 6 | 9 | 35 - 140 | 1 - 4 | 9 | 22 - 220 | 1 - 10 |
| groundsel | SENEC | 9 | 0 - 40 | 0 - 1 | 9 | 0 - 29 | 0 - 1 | 9 | 0 - 35 | 0 - 1 | 9 | 0 - 22 | 0 - 1 |
| heartleaf Alexanders | ZIAP | 9 | 0 - 40 | 0 - 1 | | | | 9 | 0 - 70 | 0 - 2 | | | |
| heath aster | SYER | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 87 | 1 - 3 | 9 | 35 - 105 | 1 - 3 | 9 | 22 - 110 | 1 - 5 |
| horsetail | EQLA | 9 | 0 - 40 | 0 - 1 | 9 | 0 - 29 | 0 - 1 | 9 | 0 - 35 | 0 - 1 | 9 | 0 - 22 | 0 - 1 |
| Maximilian sunflower | HEMA2 | 9 | 40 - 80 | 1 - 2 | 9 | 0 - 29 | 0 - 1 | 9 | 0 - 35 | 0 - 1 | | | |
| meadow anemone | ANCA8 | 9 | 0 - 40 | 0 - 1 | | | | 9 | 0 - 35 | 0 - 1 | | | |
| Nuttall's violet | VINU2 | 9 | 0 - 40 | 0 - 1 | 9 | 0 - 29 | 0 - 1 | | | | | | |
| prairie coneflower | RACO3 | 9 | 40 - 80 | 1 - 2 | 9 | 0 - 58 | 0 - 2 | 9 | 0 - 35 | 0 - 1 | | | |
| silverleaf scurfpea | PEAR6 | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 87 | 1 - 3 | 9 | 35 - 70 | 1 - 2 | 9 | 22 - 66 | 1 - 3 |
| sunflower | HELIA3 | 9 | 0 - 80 | 0 - 2 | 9 | 0 - 58 | 0 - 2 | 9 | 0 - 35 | 0 - 1 | | | |
| tall gayfeather | LIAS | 9 | 0 - 40 | 0 - 1 | | | | 9 | 0 - 35 | 0 - 1 | | | |
| western ragweed | AMPS | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 116 | 1 - 4 | 9 | 35 - 105 | 1 - 3 | 9 | 22 - 154 | 1 - 7 |
| western yarrow | ACMIO | 9 | 40 - 80 | 1 - 2 | 9 | 29 - 116 | 1 - 4 | 9 | 35 - 105 | 1 - 3 | 9 | 22 - 132 | 1 - 6 |
| native forbs | 2FN | 9 | 40 - 120 | 1 - 3 | 9 | 0 - 87 | 0 - 3 | 9 | 0 - 105 | 0 - 3 | 9 | 0 - 110 | 0 - 5 |
| introduced forbs | 2F1 | | | | 9 | 29 - 116 | 1 - 4 | 9 | 35 - 105 | 1 - 3 | 9 | 44 - 220 | 2 - 10 |
| SHRUBS | | 10 | 80 - 200 | 2 - 5 | 10 | 29 - 145 | 1 - 5 | 10 | 70 - 175 | 2 - 5 | 10 | 0 - 66 | 0 - 3 |
| rose | ROSA5 | 10 | 40 - 80 | 1 - 2 | 10 | 0 - 58 | 0 - 2 | 10 | 35 - 70 | 1 - 2 | 10 | 0 - 22 | 0 - 1 |
| snowberry | SYMPH | 10 | 40 - 120 | 1 - 3 | 10 | 29 - 87 | 1 - 3 | 10 | 35 - 105 | 1 - 3 | 10 | 0 - 44 | 0 - 2 |
| other shrubs | 2SHRUB | 10 | 0 - 80 | 0 - 2 | 10 | 0 - 58 | 0 - 2 | 10 | 0 - 70 | 0 - 2 | 10 | 0 - 44 | 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 | | | 2950 - 3560 - 4100 | | 1845 - 2523 - 3120 | | 2580 - 3115 - 3695 | | 1410 - 1837 - 2205 | | | | |
| FORBS | | | 175 - 300 - 475 | | 130 - 290 - 520 | | 155 - 263 - 410 | | 190 - 330 - 525 | | | | |
| SHRUBS | | | 75 - 140 - 225 | | 25 - 87 - 160 | | 65 - 123 - 195 | | 0 - 33 - 70 | | | | |
| TOTAL | | | 3200 - 4000 - 4800 | | 2000 - 2900 - 3800 | | 2800 - 3500 - 4300 | | 1600 - 2200 - 2800 | | | | |

This list of plants and their relative proportions are based on near normal years. Fluctuations in species composition and relative production may change from year to year dependent upon precipitation or other climatic factors. RV = Representative value. Refer to PLANTS database for scientific names and codes: <http://plants.usda.gov>

Plant Community and Vegetation State Narratives

Reference State (State 1)

This state represents the natural range of variability that dominated the dynamics of this ES. This state was diverse, stable, productive, and well adapted to the Northern Great Plains. The high water table supplied much of the moisture for plant growth. Plant litter was properly distributed with little movement and natural plant mortality was very low. This was a sustainable state in terms of soil stability, watershed function, and biologic integrity. This state was dominated by warm-season grasses, with lesser amounts of cool-season grasses. The primary disturbance mechanisms for this site in the reference condition included sporadic fire and grazing by large herding ungulates. Timing of fires and grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Mid- and tall stature grass species could have declined with a corresponding increase in short stature warm-season grasses and cool-season grass-like species occurring. Today, a similar state (State 2) can be found on areas that are properly managed with grazing and/or prescribed burning and sometimes on areas receiving occasional short periods of rest. These sites are differentiated by the presence of exotic species such as Kentucky bluegrass and smooth brome. On most Limy Subirrigated ESs within the MLRA, these species have invaded and are now present. It is likely that attaining the reference state as described here (without the presence of exotic herbaceous species) is not possible.

1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase

Interpretations are based primarily on the 1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase (this is also considered climax). This community phase was the most dominant both temporally and spatially. The prevailing climate and weather patterns favored the development of this community phase dominated by tall and mid-warm-season and mid-cool-season grasses such as little bluestem, big bluestem, porcupine grass, and/or green needlegrass. These forages have a high tolerance of calcium carbonate present in the soils on this ES. Other grass and grass-like species included sideoats grama, western wheatgrass, slender wheatgrass, and sedge. A variety of native perennial forbs were present but only in slight amounts. The potential vegetation was about 85 percent grass and grass-like species, 10 percent forbs, and 5 percent shrubs by air-dry weight.

This plant community phase was diverse, stable, and productive, tolerant of limy soils, and was well adapted to the Northern Great Plains. The water table supplied much of the moisture for plant growth. Community dynamics, nutrient cycle, water cycle, and energy flow were functioning properly. Plant litter was properly distributed with very little movement offsite and natural plant mortality was very low. This was a sustainable plant community in terms of soil stability, watershed function, and biologic integrity.

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: SD5304

Growth curve name: Southern Dark Brown Glaciated 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 | 17 | 25 | 25 | 15 | 7 | 1 | 0 | 0 |

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

- 1.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the 1.2 Wheatgrass/Little Bluestem/Grama Plant Community Phase.

1.2 Wheatgrass/Little Bluestem/Grama Community Phase

This plant community evolved under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community was made up of approximately 80 percent grasses and grass-like species, 15 percent forbs, and 5 percent shrubs.

Dominant grass and grass-like species included western wheatgrass, little bluestem, and grama species. Other grass and grass-like species included big bluestem, tall dropseed, green needlegrass, and porcupine grass. Forbs commonly found in this plant community included cudweed sagewort, goldenrod, and western yarrow. This plant community had similar plant composition to the 2.2 Wheatgrass/Little Bluestem/Grama/Kentucky Bluegrass Plant Community Phase (refer to the plant composition tables). The main difference is that this plant community phase did not have the presence of nonnative invasive species such as Kentucky bluegrass.

When compared to the 1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase, blue grama, sideoats grama, and western wheatgrass increased. Little bluestem and big bluestem decreased and production of all tall grasses was reduced. This plant community was moderately resistant to change. The herbaceous species present were well adapted to grazing; however, species composition could be altered through long-term overgrazing. If the herbaceous component was intact, it tended to be resilient if the disturbance was not long-term.

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: SD5302

Growth curve name: Southern Dark Brown Glaciated Plains, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant.

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

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

- 1.2a – Grazing, Precipitation, and Fire returned to normal disturbance regime levels and frequencies, along with periodic light to moderate grazing with possible periodic rest will shift this community to the 1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase.

Transitions from Reference State (State 1) to Native/Invaded State (State 2)

- T1 – Encroachment of nonnative species such as Kentucky bluegrass and smooth brome, in combination of disruption of natural regimes (typically fire suppression following settlement) will shift this plant community to the 2.0 Native/Invaded State.

Native/Invaded State (State 2)

This state is very similar to the reference state. The invasion of introduced species has altered the natural range of variability for this ES. This state still has a strong component of warm-season grass species but invasive introduced cool-season sodgrasses are now present in all community phases of this state. The primary disturbance mechanisms for this state include grazing by domestic livestock and infrequent fires. Grazing coupled with weather events dictate the dynamics that occur within this state. Fire could still play an important role but is typically not utilized or is suppressed. The warm-season native grasses can decline and an increase in introduced sod grasses will occur. Many times, this state appears as a mosaic of community phases caused primarily by continuous season-long grazing. The presence of calcium carbonate and alkalinity in the soils inhibits intolerant species such as smooth brome from establishing.

2.1 Little Bluestem/Big Bluestem/Needlegrass

This community phase most closely resembles the 1.0 Reference State in appearance and ecological functions (e.g., hydrologic, biotic and soil/site stability). The warm-season dominated community is maintained with grazing systems that allow for adequate recovery periods following grazing events, and potentially the combination of grazing and prescribed burning which closely mimics the natural disturbance regime. This community phase is dominated by tall- and mid-warm-season grasses, and cool-season grasses such as little bluestem, big bluestem, porcupine grass, and/or green needlegrass. Other grass and grass-like species include sideoats grama, western wheatgrass, slender wheatgrass, and sedge. A variety of native perennial forbs are present but only in minor amounts. The basic difference between this community phase and the 1.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase is the presence of minor amounts of introduced cool-season grasses and forbs. This is likely a naturally nitrogen deficient plant community but perhaps less so than the Reference State. A change in the nutrient cycle and biological activity on this ES possibly due to the introduction of nonnative species may be a causative factor leading to the eventual dominance of cool-season introduced grasses in the Invaded State.

The following growth curve is an estimate of the monthly percentages of total annual growth of the dominant species expected during a normal year.

Growth curve number: SD5509

Growth curve name: Southern Black Glaciated Plains, warm-season dominant, cool-season subdominant.

Growth curve description: Warm-season dominant, cool-season subdominant, lowland.

| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 3 | 10 | 16 | 22 | 23 | 14 | 7 | 5 | 0 | 0 |

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

- 2.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the 2.2 Wheatgrass/Little Bluestem/ Grama/Kentucky Bluegrass Plant Community Phase.

2.2 Wheatgrass/Little Bluestem/Grama/Kentucky Bluegrass Plant Community Phase

Grazing pressure reduces the tall, less grazing tolerant species, while the shorter more grazing tolerant species increase. Litter amounts are reduced and energy capture shifts to slightly earlier in the growing season due to a decline in the warm-season grass component. Nonnative grasses, such as Kentucky bluegrass, tend to increase and may begin to dominate this community phase. In the early stages of this community phase, little bluestem will initially increase along with the increase of introduced cool-season grasses. In many situations with inadequate recovery periods, the little bluestem will also begin to decline over time, facilitating the change to the Invaded State. Significant grass and grass-like species include western wheatgrass, little bluestem, sideoats grama, blue grama, Kentucky bluegrass, and sedges. Other grass and grass-like species included big bluestem, tall dropseed, green needlegrass, porcupine grass, rush, and Canada wildrye. Forbs commonly found in this plant community included cudweed sagewort, goldenrod, and western yarrow. Western snowberry and prairie rose are the principal shrubs. This community phase is approaching the threshold which would readily lead to the Invaded State. If management is significantly altered, this community phase can still be reverted back to the 2.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase.

Grazing management that allows for adequate recovery periods will tend to restore the ecological functions of this site. Fire can play a role in reducing the introduced cool-season species. The combination of grazing and fire may be the most effective method to move this community phase

towards a community resembling the 1.0 Reference State. Soil erosion is low. Infiltration is reduced while runoff is increased compared to the 1.0 Reference State.

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: SD5302

Growth curve name: Southern Dark Brown Glaciated Plains, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant.

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

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

- 2.2a – Prescribed Grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate grazing will shift this plant community to the 2.1 Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase.

Transitions from the Native Invaded State (State 2) to Invaded State (State 3)

- T2a – Non-Use and No Fire for extended periods of time (typically for 10 or more years) can lead this state over a threshold to the 3.1 Kentucky Bluegrass/Smooth Bromegrass/Bluestem (Decadent) Plant Community Phase within the 3.0 Invaded State.
- T2b – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the 3.2 Kentucky Bluegrass/Baltic Rush/Forbs Plant Community Phase within the 3.0 Invaded State.

Invaded State (State 3)

This state is the result of invasion and dominance of introduced species. This state is characterized by the dominance of Kentucky bluegrass and an increasing thatch layer that effectively blocks introduction of other plants into the system. Kentucky bluegrass has a high tolerance for calcium carbonates and a fast vegetative reproductive response to disturbance. Plant litter accumulation tends to favor the more shade tolerant introduced grass species. The nutrient cycle is also impaired and the result is typically a higher level of nitrogen which also favors the introduced species. Increasing plant litter decreases the amount of sunlight reaching plant crowns thereby shifting competitive advantage to shade tolerant introduced grass species. Studies indicate that soil biological activity is altered and this shift apparently exploits the soil microclimate and encourages growth of the introduced grass species. Once the threshold is crossed, a change in grazing management alone cannot cause a reduction in sodgrass dominance. Preliminary studies would tend to indicate this threshold may exist when Kentucky bluegrass exceeds 30 percent of the plant community and native grasses represent less than 40 percent of the plant community composition.

Once the state is well established, even drastic events such as high intensity fires driven by high fuel loads of litter and thatch will not result in more than a very short-term reduction of Kentucky bluegrass. These events may reduce the dominance of Kentucky bluegrass but due to the large amount of rhizomes in the soil, there is no opportunity for the native species to establish and dominate before Kentucky bluegrass rebounds and again dominates the system.

3.1 Kentucky Bluegrass/Smooth Brome/Bluestem (Decadent) Plant Community Phase

This community phase is dominated by Kentucky bluegrass. Big bluestem and other native warm- and cool-season native grass species are typically still present but much reduced in vigor and

production. Common forbs include American licorice, cudweed sagewort, western yarrow, and silverleaf scurfpea. Infiltration is reduced and runoff is increased when compared to the Reference State. Soil erosion is low. Much of the plant nutrients are tied up in the excessive litter. Organic matter oxidizes in the air rather than being incorporated into the soil due to the absence of animal impact and reduced soil biological activity. Typically, bunchgrasses (little bluestem) develop dead centers and rhizomatous grasses form small colonies because of a lack of tiller stimulation. Nutrient cycling is limited by the rooting depth of the Kentucky bluegrass and the alteration of the soil biotic community. Energy capture into the system is restricted to a short window provided by the early season species and the high amount of dead, standing plant material.

This plant community is somewhat resistant to change without a combination of prescribed grazing and prescribed burning. The combination of both grazing and fire is most effective in moving this plant community towards the 2.0 Native/Invaded State. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in diversity.

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: SD5302

Growth curve name: Southern Dark Brown Glaciated Plains, cool-season dominant, warm-season subdominant.

Growth curve description: Cool-season dominant, warm-season subdominant.

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

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

- 3.1a – Heavy Continuous Grazing at the same time of year, each year, without adequate recovery periods or chronic heavy grazing will shift this community to the 3.2 Kentucky Bluegrass/Baltic Rush/Forbs Plant Community Phase.
- R3a – Prescribed Fire under controlled conditions using normal disturbance regime levels and frequencies and prescribed grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate grazing will shift this plant community to the 2.0 Native/Invaded State.

3.2 Kentucky Bluegrass/Baltic Rush/Forbs Plant Community Phase

This community phase is dominated by Kentucky bluegrass with lesser amounts of Baltic rush and other grass-likes. Some native and nonnative forbs can increase in production and cover as well. The dominant grass is Kentucky bluegrass, with common forbs including cudweed sagewort, goldenrod, aster, western ragweed, western yarrow, and a variety of introduced forbs. The longer this community phase exists the more resistant and resilient it becomes. Natural or management disturbances that reduce the cover of Kentucky bluegrass are very short lived due to the abundance of rhizomes of Kentucky bluegrass in the soil and the lack of propagules of other species. Production is limited to the sod forming species.

Energy capture into this system is limited to one early growing species. Runoff increases and is the highest of any plant community phase on this ES. Nutrient cycling is severely limited to the rooting depth of the Kentucky bluegrass and production is limited.

Growth curve number: SD5301

Growth curve name: Southern Dark Brown Glaciated Plains, cool-season dominant.

Growth curve description: Cool-season dominant.

| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 4 | 12 | 25 | 36 | 10 | 5 | 4 | 4 | 0 | 0 |

3.3 Annual/Pioneer, Non-native Perennial Plant Community Phase

This plant community develops under severe disturbance, typically abandonment after cropping. The dominant vegetation includes pioneer annual or perennial grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include foxtail barley, barnyardgrass, quackgrass, plains bluegrass, Kentucky bluegrass, Baltic rush, and sedges. The dominant forbs will likely include western ragweed, Canada thistle, and other early successional species. The community is susceptible to invasion of nonnative species due to severe soil disturbances and relatively high percent of bare ground. This plant community is resistant to change as long as soil disturbance or severe vegetation defoliation persists thus holding back secondary plant succession.

Significant economic inputs, management, and time would be required to move this plant community toward a higher successional state. Secondary succession is highly variable, depending upon availability and diversity of a viable reproductive source of higher successional species. This plant community may be renovated to improve the production capability but management changes would be needed to maintain the new plant community. The total annual production ranges from 500 to 1,500 lbs./ac. (air-dry weight) depending upon growing conditions.

No growth curve has been assigned to this plant community phase due to the highly variable nature of the plant community.

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

- 3.3a – Time. This community pathway occurs with the passage of time as successional processes take place and perennial plants gradually begin to establish on the site again. This pathway will shift this plant community to the 3.2 Kentucky Bluegrass/Baltic Rush/Forbs Plant Community Phase.

Restoration Pathway from Invaded State (State 3) to Native/Invaded State (State 2)

- R3b – Seeding target species followed by prescribed grazing that includes alternating season of utilization while providing adequate rest recovery periods of periodic light to moderate grazing will shift this plant community to the 2.0 Native/Invaded State.

Ecological Site Interpretations

Animal Community – Wildlife Interpretations

-- Under Development --

Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase (1.1):

Wheatgrass/Little Bluestem/Grama Plant Community Phase (1.2):

Little Bluestem/Big Bluestem/Needlegrass Plant Community Phase (2.1):

Wheatgrass/Little Bluestem/Grama/Kentucky Bluegrass Plant Community Phase (2.2):

Kentucky Bluegrass/Smooth Bromegrass/Bluestem (Decadent) Plant Community Phase (3.1):

Kentucky Bluegrass/Baltic Rush/Forbs Plant Community Phase (3.2):

Annual/Pioneer, Non-native Perennial Plant Community Phase (3.3):

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

| Common Name | Cattle | Sheep | Horses | Deer | Antelope | Bison | Elk |
|-------------------------------|---------|---------|---------|---------|----------|---------|---------|
| Grasses and Grasslikes | | | | | | | |
| 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 |
| 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 |
| 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 |
| Indiangrass | 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 |
| switchgrass | U D D U | U D U U | U D D U | N N N N | N N N N | U D D U | U D D U |
| tall 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| witchgrass | U U D U | N U N N | U U D U | N U N N | N U N N | U U D U | U U D U |
| 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 |
| Scribner panicum | U U D U | N U N N | U U D U | N U N N | N U N N | U U D U | U U D U |
| 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 |
| rush | 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 |
| Forbs | | | | | | | |
| American licorice | U U D U | N U U N | U U D U | N U U N | N U U N | U U D U | N U U N |
| aster | U U D U | U U D U | U U D U | U U D U | U U D U | U U D U | U U D U |
| blue lettuce | 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 |
| cinquefoil | 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 |
| 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 |
| 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 gromwell | 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 |
| Flodman's thistle | 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 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 |
| groundsel | 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 |
| heartleaf Alexanders | 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 |
| 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 |
| horsetail | 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 |
| Maximilian 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 |
| meadow anemone | 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 U U |
| Nuttall's violet | N U N N | N U N N | N U N N | N U N N | N U N N | N U N N | N U N N |
| 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 |
| silverleaf 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 |
| 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 |
| 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 |
| Shrubs | | | | | | | |
| 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 |
| 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 |

N = not used; **U** = undesirable; **D** = desirable; **P** = preferred; **T** = toxic

[†] Quarters: 1 – Jan., Feb., Mar.; 2 – Apr., May, Jun.; 3 – Jul., Aug., Sep.; 4 – Oct., Nov., Dec.

Animal Community – Grazing Interpretations

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

| Plant Community | Average Annual Production (lbs./acre, air-dry) | Stocking Rate* (AUM/acre) |
|--|--|---------------------------|
| Little Bluestem/Big Bluestem/Needlegrass (1.1, 2.1): | 4,000 | 1.10 |
| Wheatgrass/Little Bluestem/Grama (1.2): | 2,900 | 0.79 |
| Kentucky Bluegrass/Smooth Bromegrass/Bluestem (3.1): | 3,500 | 0.96 |
| Kentucky Bluegrass/Baltic Rush/Forbs (3.2): | 2,200 | 0.60 |
| Annual/Pioneer, Non-native Perennial (3.3): | 1,800 | 0.49 |

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

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

Hydrology Functions

Water is the principal factor limiting forage production on this site. This site contains soils in Hydrologic Group B. Infiltration is moderately slow and runoff potential for this site is negligible to medium. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational Uses

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

Wood Products

No appreciable wood products are typically present on this site.

Other Products

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

Supporting Information

Associated Sites

Wet Meadow (R053CY004SD), Loamy Overflow (R053CY020SD), Subirrigated (R053CY003SD)

Similar Sites

(R053CY003SD) – Subirrigated [more big bluestem, less little bluestem; higher production]

Inventory Data References

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist (RMS), NRCS; Shane Deranleau, RMS, NRCS; and Mitch Faulkner, RMS, NRCS.

State Correlation

This site has been correlated in SD in MLRA 53C.

Field Offices/Counties

| | | | | | |
|-------------|---------------|--------|--------|--------------------|----------|
| Chamberlain | Brule/Buffalo | Huron | Beadle | Plankinton | Aurora |
| Faulkton | Faulk | Miller | Hand | Selby | Walworth |
| Gettysburg | Potter | Onida | Sully | Wessington Springs | Jerauld |
| Highmore | Hyde | Pierre | Hughes | | |

Relationship to Other Established Classifications

Level IV Ecoregions of the Conterminous United States: 42a – Missouri Coteau, 42e – Southern Missouri Coteau, 42f – Southern Missouri Coteau Slope.

Other References

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (<http://hpccsun.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.

Site Description Approval

SD, State Range Management Specialist

Date