

Ecological site R061XY009SD Sandy

Accessed: 05/07/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

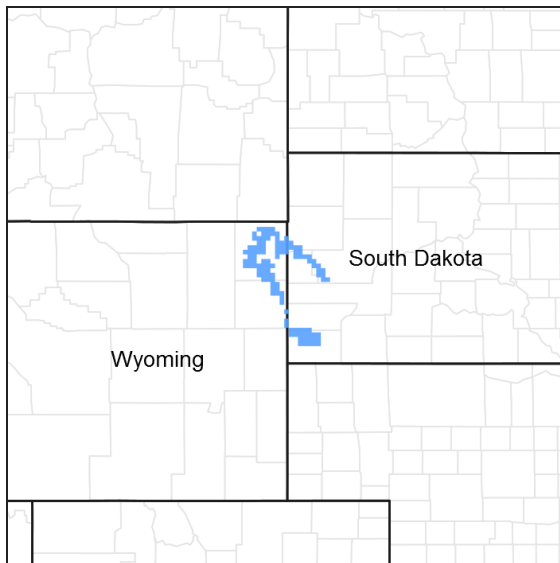


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 17a – Black Hills Foothills.

Associated sites

| | |
|-------------|--------------------------------|
| R061XN010SD | Loamy-North (18-22" PZ) |
| R061XS010SD | Loamy-South (16-18" PZ) |
| R061XY020SD | Overflow |

Similar sites

| | |
|-------------|---|
| R061XS010SD | Loamy-South (16-18" PZ) (R061XN010SD & R061XS010SD) – Loamy [less big bluestem and prairie sandreed; higher production] |
| R061XN010SD | Loamy-North (18-22" PZ) (R061XN010SD & R061XS010SD) – Loamy [less big bluestem and prairie sandreed; higher production] |

Table 1. Dominant plant species

| | |
|------|---------------|
| Tree | Not specified |
|------|---------------|

| | |
|------------|---|
| Shrub | Not specified |
| Herbaceous | (1) <i>Calamovilfa longifolia</i> (2) <i>Andropogon gerardii</i> |

Physiographic features

This site occurs on gently sloping uplands.

Table 2. Representative physiographic features

| | |
|--------------------|------------------------------------|
| Landforms | (1) Terrace |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 884–1,219 m |
| Slope | 1–6% |
| Water table depth | 203 cm |
| Aspect | Aspect is not a significant factor |

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 steppes to the east. Annual precipitation ranges from 18 to 21 inches per year, with most occurring during the growing season. 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. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

The average annual temperature is about 46° F. January is the coldest month with average temperatures ranging from about 20° F (Sundance, Wyoming (WY)) to about 26° F (Fort Meade, South Dakota (SD)). July is the warmest month with temperatures averaging from about 69° F (Sundance, WY) to about 72° F (Fort Meade, SD). The range of average monthly temperatures between the coldest and warmest months is about 48° F. Hourly winds are estimated to average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

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

Table 3. Representative climatic features

| | |
|-------------------------------|----------|
| Frost-free period (average) | 140 days |
| Freeze-free period (average) | 167 days |
| Precipitation total (average) | 533 mm |

Influencing water features

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

Soil features

The features common to soils in this site are the fine sandy loam textured surface layers and slopes of 1 to 6 percent. The soils in this site are well drained and formed in alluvium. The surface layer is 4 to 8 inches thick. The texture of the subsurface generally ranges from sandy loam to fine sandy loam. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. If present, water flow paths are broken, irregular in appearance or discontinuous. The soil surface is stable and intact. Sub-surface soil layers are not restrictive to water movement and root penetration. These soils are somewhat susceptible to wind and water erosion when vegetative cover is not adequate. Loss of 50 percent or more of the surface layer of the soils on this site can result in a shift in species composition and/or production.

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

Table 4. Representative soil features

| | |
|--|------------------------------|
| Surface texture | (1) Fine sandy loam |
| Family particle size | (1) Sandy |
| Drainage class | Well drained |
| Permeability class | Moderate to moderately rapid |
| Soil depth | 203 cm |
| Surface fragment cover <=3" | 0–2% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 15.24–17.78 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–15% |
| Electrical conductivity (0-101.6cm) | 0–2 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0 |
| Soil reaction (1:1 water) (0-101.6cm) | 6.1–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–2% |
| Subsurface fragment volume >3" (Depth not specified) | 0% |

Ecological dynamics

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

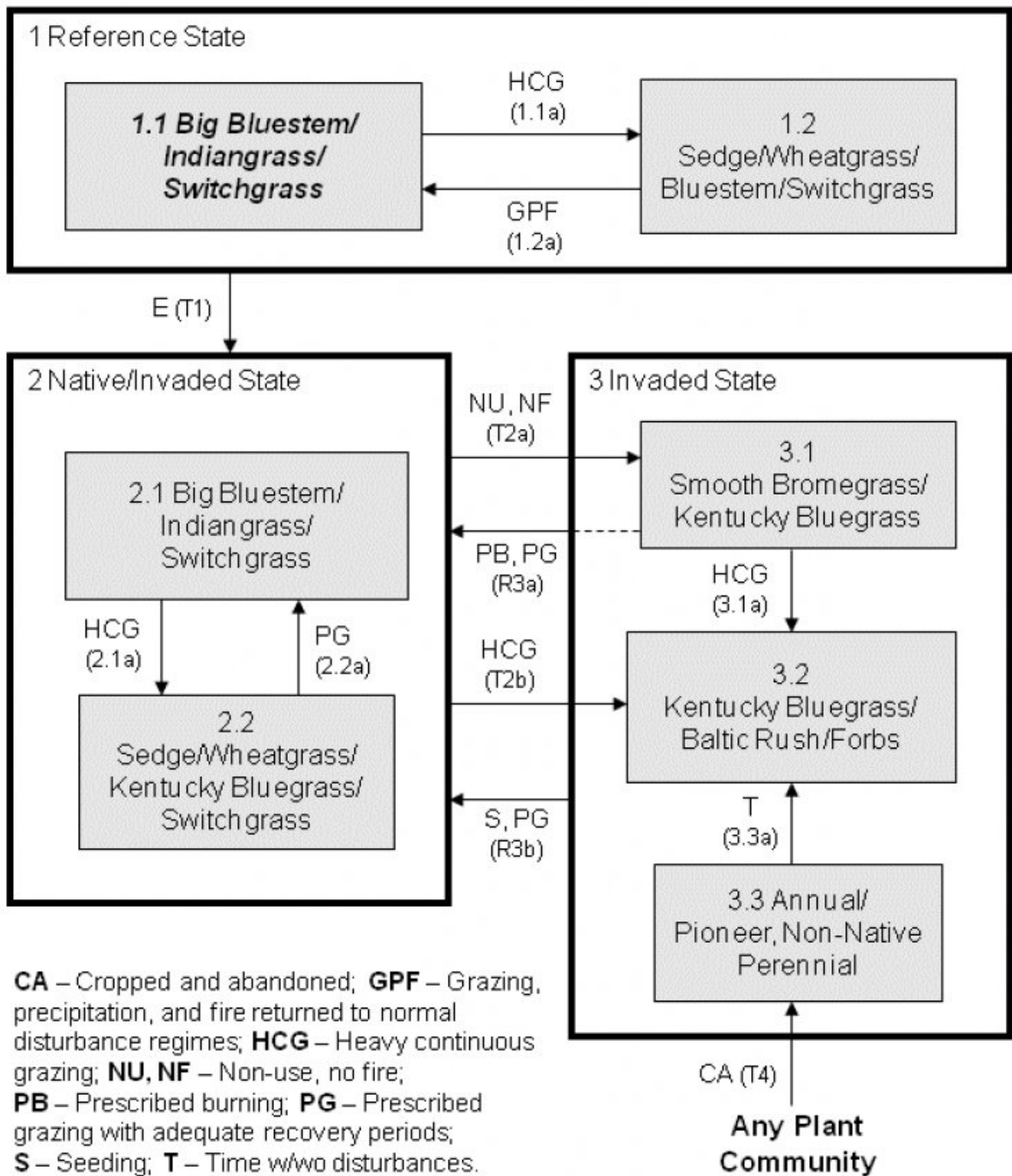
Continuous season-long grazing (during the typical growing season of May through October) and/or heavy continuous grazing (e.g., every spring and/or every summer at moderate to heavy stocking levels) without adequate recovery periods following grazing events causes departure from the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase. Short grass and grass-like species such as sedge, blue grama, and bluegrass will increase and eventually develop into a sod. Western wheatgrass will increase initially and then begin to decrease. Big bluestem, switchgrass, and Indiangrass will decrease in frequency and production. Excessive defoliation can cause blue grama and annuals to increase and dominate the site.

Interpretations are primarily based on the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase (1.1). It

has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant community phases, states, transitional pathways, and thresholds have been determined through similar studies and experience.

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

State and transition model



State 1 Reference

This state represents the natural range of variability that dominates the dynamics of this ecological site. This state was dominated by cool-season grasses with warm-season grasses being subdominant. In pre-European times, the primary disturbance mechanisms for this site in the reference condition included frequent 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. Taller cool- and warm-season grasses would have declined and a corresponding increase in short statured grass and grass-like species would have occurred. Today, a similar state 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.

Community 1.1 Bluestem/Prairie Sandreed/Needlegrass



Interpretations are based primarily on the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase (this is also considered to be climax). The potential vegetation is about 80 percent grasses or grass-like plants, 10 percent forbs, and 10 percent shrubs. The community is dominated by warm-season grasses with cool-season grasses being subdominant. The major grasses include prairie sandreed, big bluestem, sand bluestem, little bluestem, needleandthread, and sideoats grama. Other grass or grass-like species include blue grama, slender wheatgrass, Indiangrass, blue grama, switchgrass, and threadleaf sedge. This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity.

Table 5. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1771 | 2382 | 2948 |
| Shrub/Vine | 123 | 210 | 319 |
| Forb | 123 | 211 | 319 |
| Total | 2017 | 2803 | 3586 |

Figure 5. Plant community growth curve (percent production by month). SD6105, Black Hills Foot Slopes, warm-season dominant. Warm-season dominant.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 2 | 5 | 15 | 25 | 30 | 15 | 7 | 1 | | |

Community 1.2 Needleandthread/Prairie Sandreed

This plant community phase is a result of continuous season-long grazing or prolonged periods of light use or non-use and a lack of fire. The potential vegetation is about 75 percent grasses or grass-like plants, 15 percent forbs, and 10 percent shrubs. The community is co-dominated by cool- and warm-season grasses. The major grasses include needleandthread, prairie sandreed, big bluestem, little bluestem, and blue grama. Other grass or grass-like species include sideoats grama, sand bluestem, western wheatgrass, prairie junegrass, and threadleaf sedge. Kentucky bluegrass and cheatgrass also begin to invade. Forbs commonly include cudweed sagewort, goldenrod, scurfpea, white prairie aster, and western ragweed. Shrubs include western snowberry, fringed sagewort, rose, and leadplant. This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity. However, blue grama and sedge have increased, and

runoff and infiltration will begin to be negatively affected.

Table 6. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1356 | 1849 | 2275 |
| Forb | 106 | 224 | 387 |
| Shrub/Vine | 106 | 168 | 252 |
| Total | 1568 | 2241 | 2914 |

**Figure 7. Plant community growth curve (percent production by month).
SD6103, Black Hills Foot Slopes, cool-season/warm-season co-dominant.
Cool-season, warm-season co-dominant.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 3 | 10 | 20 | 28 | 21 | 10 | 5 | 3 | | |

Community 1.3 Needleandthread/Blue Grama/Annual Brome

This plant community evolves under heavy continuous grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 70 percent grasses and grass-like species, 15 percent forbs, and 15 percent shrubs. Dominant grasses include needleandthread, blue grama, and threadleaf sedge. Annual brome (cheatgrass and/or Japanese brome grass) may also invade and become significant. Grasses of secondary importance include western wheatgrass, little bluestem, hairy grama, sideoats grama, and Kentucky bluegrass. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, scurfpea, and western ragweed. When compared to the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase (1.1), blue grama and threadleaf sedge have increased. Prairie sandreed, big bluestem, and other tall and mid-statured grasses have decreased, and production is also reduced. 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. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Table 7. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 1154 | 1614 | 1995 |
| Shrub/Vine | 95 | 202 | 347 |
| Forb | 95 | 202 | 347 |
| Total | 1344 | 2018 | 2689 |

**Figure 9. Plant community growth curve (percent production by month).
SD6102, Black Hills Foot Slopes, cool-season dominant, warm-season sub-dominant. Cool-season dominant, warm-season sub-dominant.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 3 | 10 | 23 | 34 | 15 | 6 | 5 | 4 | | |

Pathway 1.1a Community 1.1 to 1.2

Continuous season-long grazing or prolonged periods with very light use or no use and a lack of fire will cause this plant community to shift to the 1.2 Needleandthread/Prairie Sandreed Plant Community Phase. With continuous season-long grazing, some areas will receive little or no grazing while other areas will be repeatedly grazed.

Pathway 1.2a

Community 1.2 to 1.1

Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the 1.1 Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase.

Conservation practices

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|--------------------|
| Prescribed Grazing |
|--------------------|

Pathway 1.2b

Community 1.2 to 1.3

Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season) or a combination of disturbances for extended periods of time will lead to the 1.3 Needleandthread/Blue Grama/Annual Brome Plant Community Phase.

Pathway 1.3a

Community 1.3 to 1.2

Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the 1.2 Needleandthread/Prairie Sandreed Plant Community Phase or possibly to the 1.1 Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase.

State 2

Shortgrass Sod

This state typically occurs as a result on continuous season-long grazing at moderate to heavy stocking levels over extended periods of time. Gradually short-statured species such as blue grama and threadleaf sedge become dominant. This change in plant composition alters the hydrologic cycle increasing runoff and reducing infiltration. This is due to the compact, short depth of the rooting structure of the dominant species, and in the advanced stages, to the increased bare ground.

Community 2.1

Sedge/Blue Grama/Short-statured Shrubs

This plant community evolved under moderate to heavy continuous season-long grazing or from over utilization during extended drought periods. This plant community may also exist adjacent to prairie dog colonies. The potential plant community is made up of approximately 70 percent grasses and grass-like species, 15 percent forbs, and 15 percent shrubs. Dominant grasses typically include blue grama and threadleaf sedge. Grasses of secondary importance include western wheatgrass, hairy grama, sun sedge, needleandthread, and sand dropseed. Forbs commonly found in this plant community include cudweed sagewort, goldenrod, scurfpea, western ragweed, and western yarrow. When compared to the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase (1.1), blue grama and threadleaf sedge are dominant on this plant community. Cool-season grasses have decreased significantly. This vegetation state is very resistant to change. The herbaceous species present are well adapted to grazing; however, composition can be altered through long-term prescribed grazing. This plant community has significantly less production. The thick sod prevents other species from getting established. Lack of litter and reduced plant vigor causes higher soil temperatures, poor water infiltration rates, and high evapotranspiration which gives blue grama a competitive advantage over most other grasses. Soil erosion will be minimal due to the sod forming habit of blue grama and buffalograss.

Table 8. Annual production by plant type

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 773 | 1076 | 1345 |
| Shrub/Vine | 62 | 135 | 224 |
| Forb | 62 | 135 | 224 |
| Total | 897 | 1346 | 1793 |

Figure 11. Plant community growth curve (percent production by month).
SD6103, Black Hills Foot Slopes, cool-season/warm-season co-dominant.
Cool-season, warm-season co-dominant.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 3 | 10 | 20 | 28 | 21 | 10 | 5 | 3 | | |

Community 2.2 Sedge/Plains Pricklypear, Bare Ground

This plant community is a result of heavy continuous grazing over extended periods of time, or from a combination of prolonged periods of below-average precipitation and other disturbances. This plant community is similar to the 2.1 Sedge/Blue Grama/Short-statured Shrubs Plant Community Phase, but the grass cover has been reduced even further, and bare ground has increased. Short-statured shrubs such as plains pricklypear and broom snakeweed also have increased. The total annual production is typically about 900 pounds per acre on an air-dry weight basis. Runoff is increased even further due to the increase in bare ground, and erosion will begin to increase.

Figure 12. Plant community growth curve (percent production by month).
SD6103, Black Hills Foot Slopes, cool-season/warm-season co-dominant.
Cool-season, warm-season co-dominant.

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 3 | 10 | 20 | 28 | 21 | 10 | 5 | 3 | | |

Pathway 2.1a Community 2.1 to 2.2

Heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season) or a combination of disturbances for extended periods of time will lead to the 2.2 Sedge/Plains Pricklypear, Bare Ground Plant Community Phase.

Pathway 2.2a Community 2.2 to 2.1

Prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest will convert this plant community to the 2.1 Sedge/Blue Grama/Short-statured Shrubs Plant Community Phase. Brush management may also be needed to expedite this pathway.

Conservation practices

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|--------------------|
| Prescribed Grazing |
|--------------------|

State 3 Early Seral

This state is the result of very heavy, concentrated disturbance such as cropping, concentrated rodent activity, or concentrated livestock areas. This State can also result from invasion by highly competitive weed species such as Canada thistle, hound's tongue, leafy spurge, or knapweeds. In most cases, this phase is dominated by annual

and/or pioneer perennial species. Bare ground is also typically much higher than on any other plant community phase.

Community 3.1 Annual/Pioneer Perennial

This plant community developed under continuous heavy grazing or other excessive disturbances (e.g., heavy use areas, abandoned cropland, defoliation by rodents, etc.). The potential plant community is made up of approximately 60 to 80 percent grasses and grass-like species, 15 to 35 percent forbs, and 2 to 5 percent shrubs. The dominant grass is often threeawn. Other grasses may include cheatgrass, annual brome grass (Japanese brome and cheatgrass), sedge, blue grama, sand dropseed, bluegrass, and western wheatgrass. The dominant forbs include fetid marigold, sweetclover, western ragweed, cudweed sagewort, and other invader-like species. The dominant shrubs include fringed sagewort, broom snakeweed and cactus. A wide variety of other early seral plant species can occupy this site in varying amounts. This plant community is susceptible to invasion of Canada thistle and other non-native species because of the relatively high percent of bare ground. Compared to the Bluestem/Prairie Sandreed/Needlegrass Plant Community Phase (1.1), red threeawn, annual brome grasses, and percent of bare ground has increased. Western wheatgrass, needlegrasses and other cool-season grasses have decreased as have the warm-season species including big bluestem, sideoats grama, and little bluestem. Plant diversity is low (plant richness may be high, but areas are often dominated by a few species). The ecological processes are difficult to restore because of the loss of plant diversity and overall soil disturbance. Soil erosion is potentially very high because of the bare ground and shallow rooted herbaceous plant community. Water runoff will increase and infiltration will decrease due to animal related soil compaction and loss of root mass due to low plant diversity and vigor. This plant community will require significant economic inputs and time to move towards another plant community. This movement is highly variable in its succession. This is due to the loss of diversity (including the loss of the seed bank), within the existing plant community, and the plant communities on adjacent sites.

Transition T1a State 1 to 2

Continuous season-long grazing over extended periods of time or the beginnings of frequent and severe defoliation (as occurs adjacent to prairie dog colonies) will tend to shift this plant community over a threshold leading to the Shortgrass Sod State (State 2).

Transition T1b State 1 to 3

Heavy continuous grazing (typically very heavy grazing for extended periods of time) or frequent and severe defoliation (as occurs with occupation by prairie dogs) will shift this plant community over a threshold leading to the 3.1 Annual/Pioneer Perennial Plant Community Phase within the Early Seral State (State 3).

Restoration pathway R2 State 2 to 1

Long-term prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest may eventually shift this plant community over a threshold to the Reference State (State 1).

Conservation practices

| |
|--------------------|
| Prescribed Grazing |
|--------------------|

Restoration pathway R2 State 3 to 1

Long-term prescribed grazing (alternating season of use and providing adequate recovery periods) or periodic light to moderate grazing possibly including periodic rest may eventually shift this plant community over a threshold to the Reference State (State 1).

Conservation practices

Prescribed Grazing

Additional community tables

Table 9. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|----------------------------------|--------|---|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tall Warm-Season Grasses | | | 841–1401 | |
| | prairie sandreed | CALO | <i>Calamovilfa longifolia</i> | 280–841 | – |
| | big bluestem | ANGE | <i>Andropogon gerardii</i> | 140–560 | – |
| | sand bluestem | ANHA | <i>Andropogon hallii</i> | 56–560 | – |
| | switchgrass | PAV12 | <i>Panicum virgatum</i> | 0–224 | – |
| | Indiangrass | SONU2 | <i>Sorghastrum nutans</i> | 0–140 | – |
| 2 | Mid Warm-Season Grasses | | | 280–560 | |
| | little bluestem | SCSC | <i>Schizachyrium scoparium</i> | 140–560 | – |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 28–224 | – |
| 3 | Cool-Season Bunchgrasses | | | 140–420 | |
| | needle and thread | HECOC8 | <i>Hesperostipa comata</i> ssp. <i>comata</i> | 140–420 | – |
| | porcupinegrass | HESP11 | <i>Hesperostipa spartea</i> | 0–140 | – |
| | Canada wildrye | ELCA4 | <i>Elymus canadensis</i> | 0–140 | – |
| 4 | Wheatgrass | | | 140–280 | |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 140–280 | – |
| | slender wheatgrass | ELTR7 | <i>Elymus trachycaulus</i> | 0–140 | – |
| 5 | Short Warm-Season Grasses | | | 28–140 | |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 28–140 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–84 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–56 | – |
| 6 | Other Native Grasses | | | 28–140 | |
| | Graminoid (grass or grass-like) | 2GRAM | <i>Graminoid (grass or grass-like)</i> | 0–112 | – |
| | prairie Junegrass | KOMA | <i>Koeleria macrantha</i> | 28–84 | – |
| | Sandberg bluegrass | POSE | <i>Poa secunda</i> | 0–56 | – |
| 7 | Grass-likes | | | 28–140 | |
| | threadleaf sedge | CAFI | <i>Carex filifolia</i> | 28–140 | – |
| | Grass-like (not a true grass) | 2GL | <i>Grass-like (not a true grass)</i> | 0–84 | – |
| Forb | | | | | |
| 8 | Forbs | | | 140–280 | |
| | Forb, native | 2FN | <i>Forb, native</i> | 28–84 | – |
| | stiff sunflower | HEPA19 | <i>Helianthus pauciflorus</i> | 28–84 | – |
| | hairy false goldenaster | HEVI4 | <i>Heterotheca villosa</i> | 28–56 | – |
| | hoary puccoon | LICA12 | <i>Lithospermum canescens</i> | 28–56 | – |
| | dotted blazing star | LIPU | <i>Liatris punctata</i> | 28–56 | – |

| | | | | | |
|-------------------|----------------------------|--------|--|---------|---|
| | field sagewort | ARCA12 | <i>Artemisia campestris</i> | 28–56 | – |
| | white sagebrush | ARLU | <i>Artemisia ludoviciana</i> | 28–56 | – |
| | false boneset | BREU | <i>Brickellia eupatorioides</i> | 0–56 | – |
| | purple prairie clover | DAPU5 | <i>Dalea purpurea</i> | 28–56 | – |
| | beardtongue | PENST | <i>Penstemon</i> | 28–56 | – |
| | scurfpea | PSORA2 | <i>Psoralegium</i> | 28–56 | – |
| | upright prairie coneflower | RACO3 | <i>Ratibida columnifera</i> | 28–56 | – |
| | goldenrod | SOLID | <i>Solidago</i> | 28–56 | – |
| | white prairie aster | SYFA | <i>Symphotrichum falcatum</i> | 28–56 | – |
| | longbract spiderwort | TRBR | <i>Tradescantia bracteata</i> | 28–56 | – |
| | American vetch | VIAM | <i>Vicia americana</i> | 28–56 | – |
| | scarlet beeblossom | GACO5 | <i>Gaura coccinea</i> | 28–56 | – |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 0–28 | – |
| | blacksamson echinacea | ECAN2 | <i>Echinacea angustifolia</i> | 0–28 | – |
| | sanddune wallflower | ERCAC | <i>Erysimum capitatum</i> var. <i>capitatum</i> | 0–28 | – |
| | rush skeletonplant | LYJU | <i>Lygodesmia juncea</i> | 0–28 | – |
| | Nuttall's sensitive-briar | MINU6 | <i>Mimosa nuttallii</i> | 0–28 | – |
| Shrub/Vine | | | | | |
| 9 | Shrubs | | | 140–280 | |
| | leadplant | AMCA6 | <i>Amorpha canescens</i> | 28–196 | – |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 0–84 | – |
| | rose | ROSA5 | <i>Rosa</i> | 28–84 | – |
| | snowberry | SYMPH | <i>Symphoricarpos</i> | 0–84 | – |
| | prairie sagewort | ARFR4 | <i>Artemisia frigida</i> | 0–56 | – |

Table 10. Community 1.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|---------------------------------|--------|--|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tall Warm-Season Grasses | | | 224–673 | |
| | prairie sandreed | CALO | <i>Calamovilfa longifolia</i> | 112–448 | – |
| | big bluestem | ANGE | <i>Andropogon gerardii</i> | 45–224 | – |
| | sand bluestem | ANHA | <i>Andropogon hallii</i> | 0–157 | – |
| | switchgrass | PAVI2 | <i>Panicum virgatum</i> | 0–90 | – |
| 2 | Mid Warm-Season Grasses | | | 112–224 | |
| | little bluestem | SCSC | <i>Schizachyrium scoparium</i> | 45–224 | – |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 22–157 | – |
| 3 | Cool-Season Bunchgrasses | | | 224–560 | |
| | needle and thread | HECOC8 | <i>Hesperostipa comata</i> ssp. <i>comata</i> | 224–560 | – |
| | porcupinegrass | HESP11 | <i>Hesperostipa spartea</i> | 0–67 | – |
| | Canada wildrye | ELCA4 | <i>Elymus canadensis</i> | 0–45 | – |
| 4 | Wheatgrass | | | 22–179 | |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 22–179 | – |

| | | | | | |
|-------------------|----------------------------------|--------|--|---------|---|
| | slender wheatgrass | ELIR7 | <i>Elymus trachycaulus</i> | 0-67 | - |
| 5 | Short Warm-Season Grasses | | | 45-224 | |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 45-224 | - |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0-112 | - |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0-45 | - |
| 6 | Other Native Grasses | | | 22-112 | |
| | Graminoid (grass or grass-like) | 2GRAM | <i>Graminoid (grass or grass-like)</i> | 0-67 | - |
| | prairie Junegrass | KOMA | <i>Koeleria macrantha</i> | 22-67 | - |
| | Sandberg bluegrass | POSE | <i>Poa secunda</i> | 0-22 | - |
| 7 | Grass-likes | | | 45-224 | |
| | threadleaf sedge | CAFI | <i>Carex filifolia</i> | 45-179 | - |
| | Grass-like (not a true grass) | 2GL | <i>Grass-like (not a true grass)</i> | 0-90 | - |
| 8 | Non-Native Grasses | | | 22-157 | |
| | cheatgrass | BRTE | <i>Bromus tectorum</i> | 22-112 | - |
| | bluegrass | POA | <i>Poa</i> | 0-112 | - |
| Forb | | | | | |
| 8 | Forbs | | | 112-336 | |
| | white sagebrush | ARLU | <i>Artemisia ludoviciana</i> | 22-90 | - |
| | Forb, introduced | 2FI | <i>Forb, introduced</i> | 0-67 | - |
| | Forb, native | 2FN | <i>Forb, native</i> | 0-67 | - |
| | goldenrod | SOLID | <i>Solidago</i> | 22-67 | - |
| | field sagewort | ARCA12 | <i>Artemisia campestris</i> | 22-67 | - |
| | white prairie aster | SYFA | <i>Symphotrichum falcatum</i> | 22-45 | - |
| | hairy false goldenaster | HEVI4 | <i>Heterotheca villosa</i> | 0-45 | - |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 22-45 | - |
| | purple prairie clover | DAPU5 | <i>Dalea purpurea</i> | 0-45 | - |
| | scurfpea | PSORA2 | <i>Psoraleidum</i> | 22-45 | - |
| | upright prairie coneflower | RACO3 | <i>Ratibida columnifera</i> | 22-45 | - |
| | blacksamson echinacea | ECAN2 | <i>Echinacea angustifolia</i> | 0-22 | - |
| | sanddune wallflower | ERCAC | <i>Erysimum capitatum var. capitatum</i> | 0-22 | - |
| | scarlet beeblossom | GACO5 | <i>Gaura coccinea</i> | 0-22 | - |
| | stiff sunflower | HEPA19 | <i>Helianthus pauciflorus</i> | 0-22 | - |
| | false boneset | BREU | <i>Brickellia eupatorioides</i> | 0-22 | - |
| | hoary puccoon | LICA12 | <i>Lithospermum canescens</i> | 0-22 | - |
| | dotted blazing star | LIPU | <i>Liatris punctata</i> | 0-22 | - |
| | rush skeletonplant | LYJU | <i>Lygodesmia juncea</i> | 0-22 | - |
| | beardtongue | PENST | <i>Penstemon</i> | 0-22 | - |
| | longbract spiderwort | TRBR | <i>Tradescantia bracteata</i> | 0-22 | - |
| | American vetch | VIAM | <i>Vicia americana</i> | 0-22 | - |
| Shrub/Vine | | | | | |
| 9 | Shrubs | | | 112-224 | |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 0-112 | - |
| | prairie sagewort | ARFR4 | <i>Artemisia frigida</i> | 22-112 | - |

| | | | | | |
|--|-----------|-------|--------------------------|-------|---|
| | snowberry | SYMPH | <i>Symphoricarpos</i> | 0–90 | – |
| | rose | ROSA5 | <i>Rosa</i> | 22–67 | – |
| | leadplant | AMCA6 | <i>Amorpha canescens</i> | 0–45 | – |

Table 11. Community 1.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|----------------------------------|--------|--|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tall Warm-Season Grasses | | | 40–202 | |
| | prairie sandreed | CALO | <i>Calamovilfa longifolia</i> | 20–161 | – |
| | big bluestem | ANGE | <i>Andropogon gerardii</i> | 0–81 | – |
| 2 | Mid Warm-Season Grasses | | | 20–141 | |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 20–121 | – |
| | little bluestem | SCSC | <i>Schizachyrium scoparium</i> | 0–40 | – |
| 3 | Cool-Season Bunchgrasses | | | 101–303 | |
| | needle and thread | HECOC8 | <i>Hesperostipa comata ssp. comata</i> | 101–303 | – |
| 4 | Wheatgrass | | | 20–141 | |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 20–141 | – |
| 5 | Short Warm-Season Grasses | | | 101–404 | |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 101–303 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–161 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–61 | – |
| 6 | Other Native Grasses | | | 20–101 | |
| | Graminoid (grass or grass-like) | 2GRAM | <i>Graminoid (grass or grass-like)</i> | 0–61 | – |
| | prairie Junegrass | KOMA | <i>Koeleria macrantha</i> | 20–40 | – |
| | Sandberg bluegrass | POSE | <i>Poa secunda</i> | 0–40 | – |
| 7 | Grass-likes | | | 101–303 | |
| | threadleaf sedge | CAFI | <i>Carex filifolia</i> | 101–303 | – |
| | Grass-like (not a true grass) | 2GL | <i>Grass-like (not a true grass)</i> | 0–101 | – |
| 8 | Non-Native Grasses | | | 101–303 | |
| | cheatgrass | BRTE | <i>Bromus tectorum</i> | 40–303 | – |
| | bluegrass | POA | <i>Poa</i> | 0–141 | – |
| Forb | | | | | |
| 9 | Forbs | | | 101–303 | |
| | white sagebrush | ARLU | <i>Artemisia ludoviciana</i> | 20–101 | – |
| | Forb, introduced | 2FI | <i>Forb, introduced</i> | 20–101 | – |
| | field sagewort | ARCA12 | <i>Artemisia campestris</i> | 20–81 | – |
| | goldenrod | SOLID | <i>Solidago</i> | 20–61 | – |
| | Forb, native | 2FN | <i>Forb, native</i> | 0–61 | – |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 20–61 | – |
| | scurfpea | PSORA2 | <i>Psoraleidum</i> | 20–61 | – |
| | white prairie aster | SYFA | <i>Symphotrichum falcatum</i> | 20–40 | – |
| | upright prairie coneflower | RACO3 | <i>Ratibida columnifera</i> | 0–20 | – |

| | | | | | |
|-------------------|-------------------------|--------|----------------------------|---------|---|
| | purple prairie clover | DAPU5 | <i>Dalea purpurea</i> | 0–20 | – |
| | hairy false goldenaster | HEVI4 | <i>Heterotheca villosa</i> | 0–20 | – |
| | rush skeletonplant | LYJU | <i>Lygodesmia juncea</i> | 0–20 | – |
| Shrub/Vine | | | | | |
| 10 | Shrubs | | | 101–303 | |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 20–141 | – |
| | prairie sagewort | ARFR4 | <i>Artemisia frigida</i> | 40–141 | – |
| | snowberry | SYMPH | <i>Symphoricarpos</i> | 0–61 | – |
| | rose | ROSA5 | <i>Rosa</i> | 20–40 | – |

Table 12. Community 2.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|----------------------------------|--------|--|--------------------------------|------------------|
| Grass/Grasslike | | | | | |
| 1 | Tall Warm-Season Grasses | | | 0–67 | |
| | prairie sandreed | CALO | <i>Calamovilfa longifolia</i> | 0–54 | – |
| | big bluestem | ANGE | <i>Andropogon gerardii</i> | 0–40 | – |
| 2 | Mid Warm-Season Grasses | | | 0–67 | |
| | sideoats grama | BOCU | <i>Bouteloua curtipendula</i> | 0–67 | – |
| 3 | Cool-Season Bunchgrasses | | | 0–67 | |
| | needle and thread | HECOC8 | <i>Hesperostipa comata ssp. comata</i> | 0–67 | – |
| 4 | Wheatgrass | | | 0–67 | |
| | western wheatgrass | PASM | <i>Pascopyrum smithii</i> | 0–67 | – |
| 5 | Short Warm-Season Grasses | | | 202–471 | |
| | blue grama | BOGR2 | <i>Bouteloua gracilis</i> | 135–404 | – |
| | hairy grama | BOHI2 | <i>Bouteloua hirsuta</i> | 0–135 | – |
| | sand dropseed | SPCR | <i>Sporobolus cryptandrus</i> | 0–67 | – |
| 6 | Other Native Grasses | | | 13–67 | |
| | Graminoid (grass or grass-like) | 2GRAM | <i>Graminoid (grass or grass-like)</i> | 0–40 | – |
| | Sandberg bluegrass | POSE | <i>Poa secunda</i> | 0–40 | – |
| | prairie Junegrass | KOMA | <i>Koeleria macrantha</i> | 13–27 | – |
| 7 | Grass-likes | | | 135–404 | |
| | threadleaf sedge | CAFI | <i>Carex filifolia</i> | 135–404 | – |
| | Grass-like (not a true grass) | 2GL | <i>Grass-like (not a true grass)</i> | 0–108 | – |
| 8 | Non-Native Grasses | | | 13–135 | |
| | cheatgrass | BRTE | <i>Bromus tectorum</i> | 13–135 | – |
| | bluegrass | POA | <i>Poa</i> | 0–54 | – |
| Forb | | | | | |
| 9 | Forbs | | | 67–202 | |
| | Forb, introduced | 2FI | <i>Forb, introduced</i> | 13–67 | – |
| | field sagewort | ARCA12 | <i>Artemisia campestris</i> | 13–67 | – |
| | white sagebrush | ARLU | <i>Artemisia ludoviciana</i> | 13–54 | – |
| | Cuman ragweed | AMPS | <i>Ambrosia psilostachya</i> | 13–54 | – |
| | goldenrod | SOLID | <i>Solidago</i> | 13–40 | – |
| | Forb, native | 2FN | <i>Forb, native</i> | 0–40 | – |
| | scurfpea | PSORA2 | <i>Psoraleidium</i> | 13–27 | – |
| | white prairie aster | SYFA | <i>Symphotrichum falcatum</i> | 13–27 | – |
| Shrub/Vine | | | | | |
| 10 | Shrubs | | | 67–202 | |
| | prairie sagewort | ARFR4 | <i>Artemisia frigida</i> | 40–161 | – |
| | Shrub (>.5m) | 2SHRUB | <i>Shrub (>.5m)</i> | 13–67 | – |
| | snowberry | SYMPH | <i>Symphoricarpos</i> | 0–27 | – |
| | rose | ROSA5 | <i>Rosa</i> | 0–13 | – |

Animal community

Animal Community – Grazing Interpretations

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

Bluestem/Prairie Sandreed/Needlegrass (1.1)

Average Annual Production (lbs./acre, air-dry): 2,500

Stocking Rate* (AUM/acre): 0.69

Needleandthread/Prairie Sandreed (1.2)

Average Annual Production (lbs./acre, air-dry): 2,000

Stocking Rate* (AUM/acre): 0.55

Needleandthread/Blue Grama/Annual Brome (1.3)

Average Annual Production (lbs./acre, air-dry): 1,800

Stocking Rate* (AUM/acre): 0.49

Sedge/Blue Grama/Short-statured Shrubs (2.1)

Average Annual Production (lbs./acre, air-dry): 1,200

Stocking Rate* (AUM/acre): 0.33

Sedge/Plains Pricklypear, Bare Ground (2.2)

Average Annual Production (lbs./acre, air-dry): 900

Stocking Rate* (AUM/acre): 0.25

Annual/Pioneer Perennial (3.1)

Average Annual Production (lbs./acre, air-dry): 800

Stocking Rate* (AUM/acre): 0.22

* Based on 912 lbs./acre (air-dry weight) per Animal Unit Month (AUM), and on 25% harvest efficiency (refer to USDA NRCS, National Range and Pasture Handbook).

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

Hydrological 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% ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where shortgrasses form a strong sod and dominate the site. Dominance by blue grama, buffalograss, bluegrass, and/or smooth brome grass will result in reduced infiltration and increased runoff. Areas where ground cover is less than 50% 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 variety 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.

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, NRCS; Cynthia Englebert, Range Management Specialist, Forest Service; George Gamblin, Range Management Specialist, NRCS; Tate Lantz, Range Management Specialist, NRCS; Ryan Murray, Range Management Specialist, NRCS; Cheryl Nielsen, Range Management Specialist, NRCS; L. Michael Stirling, Range Management Specialist, NRCS; Jim Westerman, Soil Scientist, NRCS.

Other references

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USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (<http://wcc.nrcs.usda.gov>)

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Contributors

Stan Boltz

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|---|
| Author(s)/participant(s) | Stan Boltz |
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| Date | 09/30/2009 |
| Approved by | Stan Boltz |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

Indicators

1. **Number and extent of rills:** Rills should not be present.

-
2. **Presence of water flow patterns:** None, or barely visible and discontinuous.
-
3. **Number and height of erosional pedestals or terracettes:** Essentially, non-existent.
-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground less than 5 percent and patches less than 2 inches in diameter.
-
5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** None.
-
7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability rating usually 5 to 6. Typically high root content, organic matter, and granular structure. Soil surface is very resistant to erosion.
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface structure is typically granular, and mollic (higher organic matter) colors of A-horizon about 5 to 9 inches deep. If conditions are other than this, refer to map unit component descriptions for component on which the site occurs.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Healthy, deep rooted native grasses enhance infiltration and reduce runoff.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer should be evident.
-
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Tall, warm-season grasses >>
- Sub-dominant: Mid, warm-season grasses > mid and tall, cool-season bunchgrasses >
- Other: Wheatgrasses (mid, cool-season) = forbs = shrubs > short, warm-season grasses = grass-like species

Additional: Other grasses occur in other functional groups in minor amounts.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little to no evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.

14. **Average percent litter cover (%) and depth (in):** 75 to 85 percent plant litter cover, roughly 0.5 to 1 inch depth. Litter cover is in contact with soil surface.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Ranges from 1,800 to 3,200 pounds/acre. Reference value is 2,500 pounds/acre (air-dry weight basis).

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Refer to State and Local Noxious Weed List; also Kentucky bluegrass, smooth brome grass.

17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses typically have vigorous rhizomes or tillers.
