

Ecological site R053BY026ND

Sandy Claypan

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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.

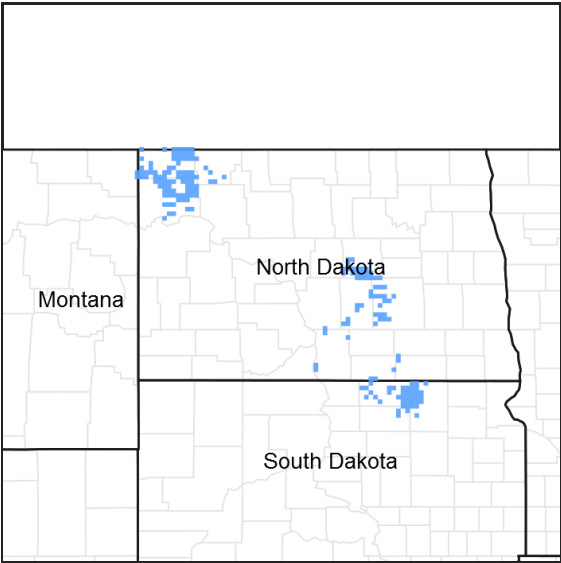


Figure 1. Mapped extent

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: 42a – Missouri Coteau; 42b – Collapsed Glacial Outwash; 42c – Missouri Coteau Slope; 42d – Northern Missouri Coteau; 42f – Southern Missouri Coteau Slope; 42g – Ponca Plains; and 42h – Southern River Breaks.

Associated sites

|             |               |
|-------------|---------------|
| R053BY007ND | Sands         |
| R053BY013ND | Thin Claypan  |
| R053BY018ND | Linear Meadow |

Similar sites

|             |  |
|-------------|--|
| R053BY002ND | <div><div>Claypan</div><div>[Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Indicator species are western wheatgrass, blue grama, heath aster, western yarrow and fringed sagewort. This site has less production, no prairie sandreed and little threadleaf sedge, more blue grama and Sandberg's bluegrass, soil texture is finer but with similar sodic subsoils layer.]</div></div> |
|-------------|--|

|             |   |
|-------------|---|
| R053BY008ND | <b>Sandy</b><br>[Does not receive additional moisture. Found on dry uplands upslope from Loamy Overflow site, down slope from Thin Upland or Shallow Loamy sites. Similar landscape position as Loamy, Sands, Clayey sites; will ribbon up to 1 inches. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site doesn't have dense sodic subsoil below 6 inches with salts below 16 inches, far less western wheatgrass, blue grama, more prairie sandreed, and sand bluestem, more production.] |
|-------------|---|

**Table 1. Dominant plant species**

|            |  |
|------------|--|
| Tree       | Not specified  |
| Shrub      | Not specified  |
| Herbaceous | (1) <i>Pascopyrum smithii</i><br>(2) <i>Hesperostipa comata</i> ssp. <i>comata</i> |

## Physiographic features

This site occurs on nearly level to rolling uplands.

**Table 2. Representative physiographic features**

|                    |  |
|--------------------|--|
| Landforms          | (1) Outwash plain<br>(2) Till plain<br>(3) Delta plain |
| Flooding frequency | None   |
| Ponding frequency  | None   |
| Elevation          | 1,600–2,000 ft   |
| Slope              | 0–3%   |
| Water table depth  | 42–80 in   |
| Aspect             | Aspect is not a significant factor                     |

## Climatic features

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

Annual precipitation ranges from 15 to 20 inches per year. The normal average annual temperature is about 41° F. January is the coldest month with average temperatures ranging from about 4° F (Powers Lake, ND) to about 10° F (Pollock, SD). July is the warmest month with temperatures averaging from about 67° F (Powers Lake, ND) to about 72° F (Pollock, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 62° F. This large annual range attests to the continental nature of this MLRA's climate. Winds average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of native cool-season plants begins in late March and continues to early to mid July. Native warm-season plants begin growth in mid May and continue to the end of August. Green up of cool-season plants can occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

|                              |          |
|------------------------------|----------|
| Frost-free period (average)  | 142 days |
| Freeze-free period (average) | 122 days |

|                               |       |
|-------------------------------|-------|
| Precipitation total (average) | 18 in |
|-------------------------------|-------|

## Influencing water features

No significant water features influence this site.

## Soil features

These are moderately deep to very deep, moderately well drained soils. They have moderately coarse to medium textured surface layers underlain by a sodic subsoil. The subsoils are moderately coarse to medium textured and are high in sodium. Saturated hydraulic conductivity is moderate to slow and available water capacity is moderate. Salinity is none to slight and sodicity is high. This site is on nearly level to gently sloping outwash plains, till plains and delta plains. Slope ranges from 0 to 3 percent. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Sub-surface soil layers are restrictive to water movement and root penetration.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web sites:

<http://www.nrcs.usda.gov/technical/efotg/>

**Table 4. Representative soil features**

|   |                         |
|---|-------------------------|
| Surface texture   | (1) Fine sandy loam     |
| Family particle size                                    | (1) Loamy               |
| Drainage class  | Moderately well drained |
| Permeability class                                      | Slow to moderate        |
| Soil depth  | 8–20 in                 |
| Surface fragment cover ≤3"                              | 0%                      |
| Surface fragment cover >3"                              | 0%                      |
| Available water capacity<br>(0–40in)                    | 2–3 in                  |
| Calcium carbonate equivalent<br>(0–40in)                | 0–20%                   |
| Electrical conductivity<br>(0–40in)                     | 0–8 mmhos/cm            |
| Sodium adsorption ratio<br>(0–40in)                     | 0–15                    |
| Soil reaction (1:1 water)<br>(0–40in)                   | 5.1–9                   |
| Subsurface fragment volume ≤3"<br>(Depth not specified) | 0–5%                    |
| Subsurface fragment volume >3"<br>(Depth not specified) | 0%                      |

## Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered quite fragile. Under continued adverse impacts, a rapid decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can slowly return to the Historic Climax Plant Community (HCPC).

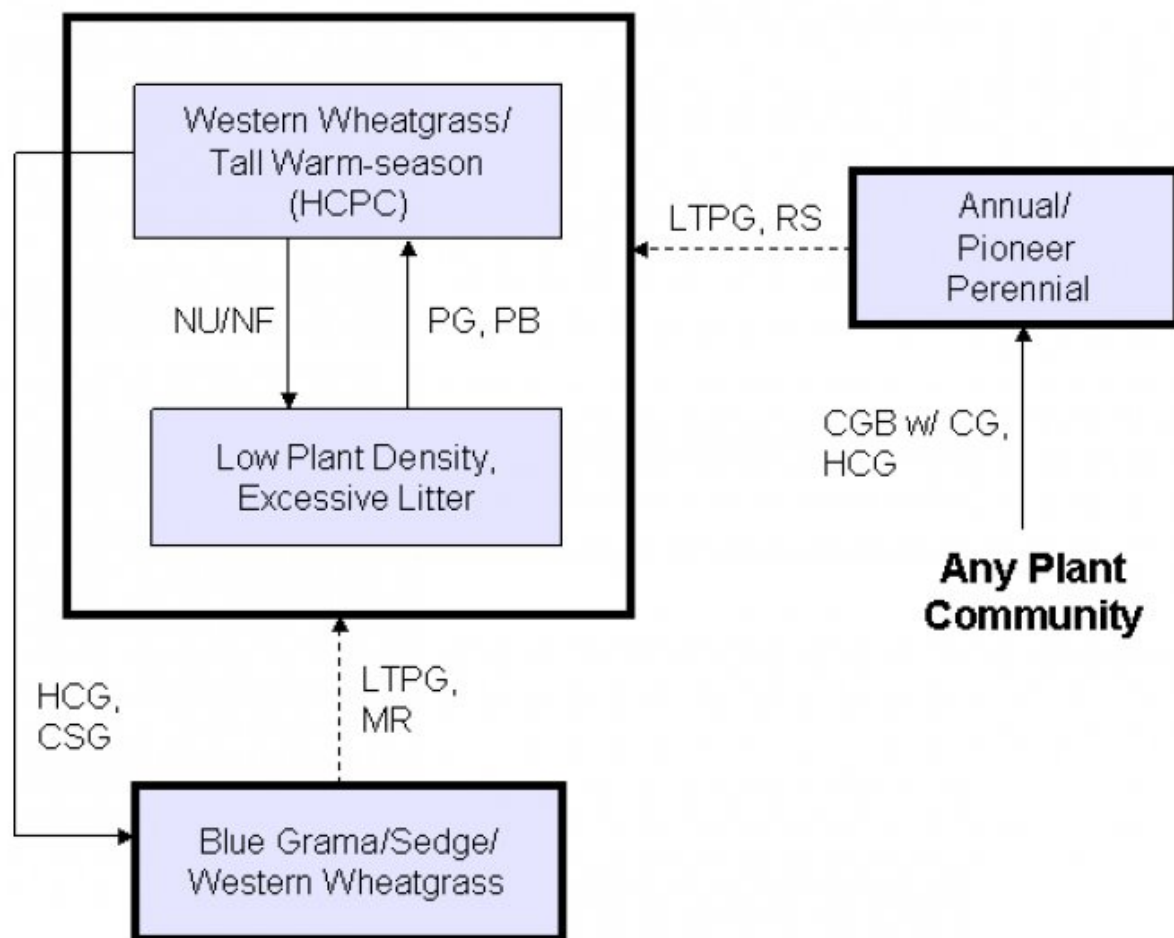
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed 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.

Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as western wheatgrass, blue grama, sedges, cudweed sagewort, hairy golden aster, prairie coneflower, scurfpea and fringed sagewort will initially increase. Prairie sandreed, sand bluestem green needlegrass, false gromwell, vetch, penstemon and leadplant will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials and annuals to increase. The resulting plant community is relatively stable and the competitive advantage prevents other species from establishing.

Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or smooth brome grass, and in time, shrubs such as western snowberry will increase.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

## **State and transition model**



**CGB w/ CG** – Cropped go-back with continuous grazing; **CSG** – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **HCPC** – Historic Climax Plant Community; **LTPG** – Long-term prescribed grazing; **MR** – Mechanical renovation with prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning, followed by prescribed grazing; **PG** – Prescribed grazing; **RS** – Range seeding with prescribed grazing.

State 1  
Western Wheatgrass/Tall Warm-Season (HCPC)

Community 1.1  
Western Wheatgrass/Tall Warm-Season (HCPC)

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). This community evolved with grazing by large herbivores and occasional prairie fire. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. Cool-season and tall warm-season grasses dominate the plant community. The co-dominant grasses include western wheatgrass and prairie sandreed. Other grasses and grass-like plants occurring on the site include needleandthread, green needlegrass, blue grama, sand bluestem, prairie junegrass and sedges. Significant forbs include stiff sunflower, false gromwell, silverleaf scurfpea, western yarrow and goldenrod. In many areas western snowberry is the principle shrub and occurs in patchy mosaic. Other shrubs include prairie rose, leadplant and fringed sagewort. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. Low available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationship.

Table 5. Annual production by plant type

| Plant Type      | Low<br>(Lb/Acre) | Representative Value<br>(Lb/Acre) | High<br>(Lb/Acre) |
|-----------------|------------------|-----------------------------------|-------------------|
| Grass/Grasslike | 1475             | 1969                              | 2460              |
| Forb            | 105              | 165                               | 225               |
| Shrub/Vine      | 20               | 66                                | 115               |
| Total           | 1600             | 2200                              | 2800              |

Figure 7. Plant community growth curve (percent production by month).  
ND5303, Missouri Coteau, cool-season/warm-season co-dominant.. Cool-  
season, warm-season co-dominant..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 2   | 6   | 21  | 40  | 20  | 6   | 4   | 1   | 0   | 0   |

State 2  
Blue Grama/Sedge/Western Wheatgrass

Community 2.1  
Blue Grama/Sedge/Western Wheatgrass

This plant community can quickly develop from the adverse effects of heavy, continuous grazing and/or annual, early spring seasonal grazing. Annual grazing too early in the spring depletes stored carbohydrates, resulting in weakening and eventual death of the cool season mid-grasses. Short grasses and grass-like and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and reduced plant vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama and sedges a competitive advantage over cool season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama, sedges and western wheatgrass are the dominant species. Other grasses that may be present include red threeawn, needleandthread, prairie junegrass and annual grasses. Forbs such as hairy goldaster, cudweed sagewort, heath aster, Lambert crazyweed, prairie coneflower, scurfpea and western yarrow may also be present. There is usually less than 10% bare ground. This plant community is relatively stable. The thick sod and competitive

advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal due to the sod forming habit of blue grama.

**Table 6. Annual production by plant type**

| Plant Type      | Low<br>(Lb/Acre) | Representative Value<br>(Lb/Acre) | High<br>(Lb/Acre) |
|-----------------|------------------|-----------------------------------|-------------------|
| Grass/Grasslike | 490              | 1020                              | 1550              |
| Shrub/Vine      | 55               | 90                                | 125               |
| Forb            | 55               | 90                                | 125               |
| <b>Total</b>    | <b>600</b>       | <b>1200</b>                       | <b>1800</b>       |

**Figure 9. Plant community growth curve (percent production by month).**  
ND5303, Missouri Coteau, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 2   | 6   | 21  | 40  | 20  | 6   | 4   | 1   | 0   | 0   |

## State 3

### Low Plant Density, Excessive Litter

#### Community 3.1

#### Low Plant Density, Excessive Litter

This plant community develops after an extended period of 15 or more years of non-use by herbivores and exclusion of fire. This plant community can be dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. Plant litter accumulates in large amounts as this community develops. Litter buildup reduces plant vigor and density, and seedling recruitment declines. Eventually litter levels become abundant enough to crowd out living plants and reduce plant density. Annual and/or biennial forbs and annual grasses commonly fill these interspaces. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. Heavy litter covers shorter understory species (i.e. short grasses and sedges) restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Non-native grasses, such as Kentucky bluegrass, crested wheatgrass, smooth brome grass and cheatgrass tend to dominant this plant community. Other grasses that may be present include western wheatgrass, needleandthread, green needlegrass and Sandberg bluegrass. The common forbs include sweetclover, green sagewort, cudweed sagewort and heath aster. Fringed sagewort and snowberry are the principal shrubs and tend to increase in density and cover. This plant community is resistant to change without prescribed grazing or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to be moisture loving and usually tends to utilize the spring moisture quickly causing forage base to become dry and not very palatable early in the summer. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in the diversity of the site.

**Table 7. Annual production by plant type**

| Plant Type      | Low<br>(Lb/Acre) | Representative Value<br>(Lb/Acre) | High<br>(Lb/Acre) |
|-----------------|------------------|-----------------------------------|-------------------|
| Grass/Grasslike | 1040             | 1445                              | 1950              |
| Shrub/Vine      | 80               | 127                               | 175               |
| Forb            | 80               | 128                               | 175               |
| <b>Total</b>    | <b>1200</b>      | <b>1700</b>                       | <b>2300</b>       |

**Figure 11. Plant community growth curve (percent production by month).**  
ND5301, Missouri Coteau, cool-season dominant.. Cool-season dominant..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 3   | 8   | 24  | 45  | 10  | 3   | 5   | 2   | 0   | 0   |

## Additional community tables

Table 8. Community 1.1 plant community composition

| Group                  | Common Name                     | Symbol | Scientific Name   | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|---------------------------------|--------|---|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |                                 |        |   |                             |                  |
| 1                      | <b>Western Wheatgrass</b>       |        |   | 330–550                     |                  |
|                        | western wheatgrass              | PASM   | <i>Pascopyrum smithii</i>                                   | 330–550                     | –                |
| 2                      | <b>Tall Warm-Season Grasses</b> |        |   | 220–330                     |                  |
|                        | prairie sandreed                | CALO   | <i>Calamovilfa longifolia</i>                               | 110–220                     | –                |
|                        | sand bluestem                   | ANHA   | <i>Andropogon hallii</i>                                    | 66–154                      | –                |
|                        | big bluestem                    | ANGE   | <i>Andropogon gerardii</i>                                  | 0–66                        | –                |
| 3                      | <b>Needlegrass</b>              |        |   | 220–330                     |                  |
|                        | needle and thread               | HECOC8 | <i>Hesperostipa comata</i> ssp. <i>comata</i>               | 220–330                     | –                |
|                        | green needlegrass               | NAVI4  | <i>Nassella viridula</i>                                    | 44–110                      | –                |
| 4                      | <b>Grama</b>                    |        |   | 110–220                     |                  |
|                        | blue grama                      | BOGR2  | <i>Bouteloua gracilis</i>                                   | 110–220                     | –                |
| 5                      | <b>Other Native Grasses</b>     |        |   | 110–220                     |                  |
|                        | slender wheatgrass              | ELTR7  | <i>Elymus trachycaulus</i>                                  | 44–176                      | –                |
|                        | little bluestem                 | SCSC   | <i>Schizachyrium scoparium</i>                              | 0–66                        | –                |
|                        | Fendler threeawn                | ARPUL  | <i>Aristida purpurea</i> var. <i>longiseta</i>              | 0–66                        | –                |
|                        | prairie Junegrass               | KOMA   | <i>Koeleria macrantha</i>                                   | 22–44                       | –                |
|                        | Grass, perennial                | 2GP    | <i>Grass, perennial</i>                                     | 22–44                       | –                |
|                        | sand dropseed                   | SPCR   | <i>Sporobolus cryptandrus</i>                               | 0–22                        | –                |
|                        | Scribner's rosette grass        | DIOLS  | <i>Dichanthelium oligosanthos</i> var. <i>scribnerianum</i> | 0–22                        | –                |
| 6                      | <b>Grass-Likes</b>              |        |   | 110–220                     |                  |
|                        | threadleaf sedge                | CAFI   | <i>Carex filifolia</i>                                      | 110–176                     | –                |
|                        | sun sedge                       | CAINH2 | <i>Carex inops</i> ssp. <i>heliophila</i>                   | 44–110                      | –                |
|                        | Grass-like (not a true grass)   | 2GL    | <i>Grass-like (not a true grass)</i>                        | 0–22                        | –                |
| <b>Forb</b>            |                                 |        |   |                             |                  |
| 8                      | <b>Forbs</b>                    |        |   | 110–220                     |                  |
|                        | Forb, perennial                 | 2FP    | <i>Forb, perennial</i>                                      | 0–66                        | –                |
|                        | western yarrow                  | ACMIO  | <i>Achillea millefolium</i> var. <i>occidentalis</i>        | 22–44                       | –                |
|                        | stiff sunflower                 | HEPA19 | <i>Helianthus pauciflorus</i>                               | 22–44                       | –                |
|                        | scurfpea                        | PSORA2 | <i>Psoralea</i>   | 22–44                       | –                |
|                        | upright prairie coneflower      | RACO3  | <i>Ratibida columnifera</i>                                 | 0–22                        | –                |
|                        | goldenrod                       | SOLID  | <i>Solidago</i>   | 0–22                        | –                |
|                        | scarlet globemallow             | SPCO   | <i>Sphaeralcea coccinea</i>                                 | 0–22                        | –                |
|                        | white heath aster               | SYER   | <i>Symphotrichum ericoides</i>                              | 0–22                        | –                |
|                        | longbract spiderwort            | TRBR   | <i>Tradescantia bracteata</i>                               | 0–22                        | –                |



|                   |                         |       |   |        |   |
|-------------------|-------------------------|-------|---|--------|---|
|                   | American vetch          | VIAM  | <i>Vicia americana</i>                          | 0–22   | – |
|                   | purple locoweed         | OXLA3 | <i>Oxytropis lambertii</i>                      | 0–22   | – |
|                   | beardtongue             | PENST | <i>Penstemon</i>                                | 0–22   | – |
|                   | spiny phlox             | PHHO  | <i>Phlox hoodii</i>                             | 0–22   | – |
|                   | hairy false goldenaster | HEVI4 | <i>Heterotheca villosa</i>                      | 0–22   | – |
|                   | blazing star            | LIATR | <i>Liatris</i>                                  | 0–22   | – |
|                   | rush skeletonplant      | LYJU  | <i>Lygodesmia juncea</i>                        | 0–22   | – |
|                   | tarragon                | ARDR4 | <i>Artemisia dracunculus</i>                    | 0–22   | – |
|                   | white sagebrush         | ARLU  | <i>Artemisia ludoviciana</i>                    | 0–22   | – |
|                   | milkvetch               | ASTRA | <i>Astragalus</i>                               | 0–22   | – |
|                   | wavyleaf thistle        | CIUN  | <i>Cirsium undulatum</i>                        | 0–22   | – |
|                   | prairie clover          | DALEA | <i>Dalea</i>                                    | 0–22   | – |
|                   | blacksamson echinacea   | ECAN2 | <i>Echinacea angustifolia</i>                   | 0–22   | – |
|                   | sanddune wallflower     | ERCAC | <i>Erysimum capitatum</i> var. <i>capitatum</i> | 0–22   | – |
|                   | scarlet beebllossom     | GACO5 | <i>Gaura coccinea</i>                           | 0–22   | – |
| <b>Shrub/Vine</b> |                         |       |   |        |   |
| 9                 | <b>Shrubs</b>           |       |   | 22–110 |   |
|                   | Subshrub (<.5m)         | 2SUBS | <i>Subshrub (&lt;.5m)</i>                       | 0–44   | – |
|                   | leadplant               | AMCA6 | <i>Amorpha canescens</i>                        | 22–44  | – |
|                   | prairie sagewort        | ARFR4 | <i>Artemisia frigida</i>                        | 22–44  | – |
|                   | rose                    | ROSA5 | <i>Rosa</i>                                     | 22–44  | – |
|                   | western snowberry       | SYOC  | <i>Symphoricarpos occidentalis</i>              | 22–44  | – |
|                   | pricklypear             | OPUNT | <i>Opuntia</i>                                  | 0–22   | – |

**Table 9. Community 2.1 plant community composition**

| Group                  | Common Name                     | Symbol | Scientific Name                                | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|---------------------------------|--------|--|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |                                 |        |  |                             |                  |
| 1                      | <b>Western Wheatgrass</b>       |        |  | 60–180                      |                  |
|                        | western wheatgrass              | PASM   | <i>Pascopyrum smithii</i>                      | 60–180                      | –                |
| 2                      | <b>Tall Warm-Season Grasses</b> |        |  | 12–60                       |                  |
|                        | prairie sandreed                | CALO   | <i>Calamovilfa longifolia</i>                  | 12–60                       | –                |
| 3                      | <b>Needlegrass</b>              |        |  | 24–96                       |                  |
|                        | needle and thread               | HECOC8 | <i>Hesperostipa comata</i> ssp. <i>comata</i>  | 24–96                       | –                |
|                        | green needlegrass               | NAVI4  | <i>Nassella viridula</i>                       | 0–12                        | –                |
| 4                      | <b>Grama</b>                    |        |  | 120–240                     |                  |
|                        | blue grama                      | BOGR2  | <i>Bouteloua gracilis</i>                      | 120–240                     | –                |
| 5                      | <b>Other Native Grasses</b>     |        |  | 36–144                      |                  |
|                        | Fendler threeawn                | ARPUL  | <i>Aristida purpurea</i> var. <i>longiseta</i> | 12–60                       | –                |
|                        | Grass, perennial                | 2GP    | <i>Grass, perennial</i>                        | 0–48                        | –                |
|                        | sand dropseed                   | SPCR   | <i>Sporobolus cryptandrus</i>                  | 12–48                       | –                |
|                        | slender wheatgrass              | ELTR7  | <i>Elymus trachycaulus</i>                     | 0–36                        | –                |
|                        | prairie Junegrass               | KOMA   | <i>Koeleria macrantha</i>                      | 12–24                       | –                |
|                        | Scribner's rosette grass        | DIOLS  | <i>Dichanthelium oligosanthos</i> var.         | 12–24                       | –                |

|                   |                               |        |  |        |   |
|-------------------|-------------------------------|--------|--|--------|---|
|                   |                               |        | <i>scribnerianum</i>                                 |        |   |
| 6                 | <b>Grass-Likes</b>            |        |  | 60–180 |   |
|                   | threadleaf sedge              | CAFI   | <i>Carex filifolia</i>                               | 60–180 | – |
|                   | sun sedge                     | CAINH2 | <i>Carex inops</i> ssp. <i>heliophila</i>            | 24–60  | – |
|                   | Grass-like (not a true grass) | 2GL    | <i>Grass-like (not a true grass)</i>                 | 0–36   | – |
| 7                 | <b>Non-Native Grasses</b>     |        |  | 12–60  |   |
|                   | smooth brome                  | BRIN2  | <i>Bromus inermis</i>                                | 0–60   | – |
|                   | Kentucky bluegrass            | POPR   | <i>Poa pratensis</i>                                 | 12–60  | – |
|                   | cheatgrass                    | BRTE   | <i>Bromus tectorum</i>                               | 0–48   | – |
|                   | crested wheatgrass            | AGCR   | <i>Agropyron cristatum</i>                           | 0–36   | – |
| <b>Forb</b>       |                               |        |  |        |   |
| 8                 | <b>Forbs</b>                  |        |  | 60–120 |   |
|                   | Forb, annual                  | 2FA    | <i>Forb, annual</i>                                  | 0–60   | – |
|                   | Forb, perennial               | 2FP    | <i>Forb, perennial</i>                               | 0–60   | – |
|                   | tarragon                      | ARDR4  | <i>Artemisia dracunculus</i>                         | 12–36  | – |
|                   | white sagebrush               | ARLU   | <i>Artemisia ludoviciana</i>                         | 12–36  | – |
|                   | scurfpea                      | PSORA2 | <i>Psoralegium</i>                                   | 12–36  | – |
|                   | goldenrod                     | SOLID  | <i>Solidago</i>                                      | 12–36  | – |
|                   | upright prairie coneflower    | RACO3  | <i>Ratibida columnifera</i>                          | 12–24  | – |
|                   | blazing star                  | LIATR  | <i>Liatris</i>                                       | 12–24  | – |
|                   | western yarrow                | ACMIO  | <i>Achillea millefolium</i> var. <i>occidentalis</i> | 12–24  | – |
|                   | prairie clover                | DALEA  | <i>Dalea</i>   | 12–24  | – |
|                   | white heath aster             | SYER   | <i>Symphyotrichum ericoides</i>                      | 12–24  | – |
|                   | sanddune wallflower           | ERCAC  | <i>Erysimum capitatum</i> var. <i>capitatum</i>      | 0–12   | – |
|                   | milkvetch                     | ASTRA  | <i>Astragalus</i>                                    | 0–12   | – |
|                   | wavyleaf thistle              | CIUN   | <i>Cirsium undulatum</i>                             | 0–12   | – |
|                   | rush skeletonplant            | LYJU   | <i>Lygodesmia juncea</i>                             | 0–12   | – |
|                   | purple locoweed               | OXLA3  | <i>Oxytropis lambertii</i>                           | 0–12   | – |
|                   | beardtongue                   | PENST  | <i>Penstemon</i>                                     | 0–12   | – |
|                   | spiny phlox                   | PHHO   | <i>Phlox hoodii</i>                                  | 0–12   | – |
|                   | scarlet globemallow           | SPCO   | <i>Sphaeralcea coccinea</i>                          | 0–12   | – |
| <b>Shrub/Vine</b> |                               |        |  |        |   |
| 9                 | <b>Shrubs</b>                 |        |  | 60–120 |   |
|                   | prairie sagewort              | ARFR4  | <i>Artemisia frigida</i>                             | 12–60  | – |
|                   | rose                          | ROSA5  | <i>Rosa</i>  | 12–48  | – |
|                   | western snowberry             | SYOC   | <i>Symphoricarpos occidentalis</i>                   | 12–36  | – |
|                   | pricklypear                   | OPUNT  | <i>Opuntia</i>                                       | 0–36   | – |
|                   | Subshrub (<.5m)               | 2SUBS  | <i>Subshrub (&lt;.5m)</i>                            | 0–36   | – |

Table 10. Community 3.1 plant community composition

| Group                  | Common Name        | Symbol | Scientific Name | Annual Production (Lb/Acre) | Foliar Cover (%) |
|------------------------|--------------------|--------|-----------------|-----------------------------|------------------|
| <b>Grass/Grasslike</b> |                    |        |                 |                             |                  |
| 1                      | Western Wheatgrass |        |                 | 95–170                      |                  |

|             |                                 |        |   |         |   |
|-------------|---------------------------------|--------|---|---------|---|
| 1           | <b>western wheatgrass</b>       |        |   | 85–170  |   |
|             | western wheatgrass              | PASM   | <i>Pascopyrum smithii</i>                                   | 85–170  | – |
| 2           | <b>Tall Warm-Season Grasses</b> |        |   | 17–85   |   |
|             | prairie sandreed                | CALO   | <i>Calamovilfa longifolia</i>                               | 17–85   | – |
|             | sand bluestem                   | ANHA   | <i>Andropogon hallii</i>                                    | 0–17    | – |
| 3           | <b>Needlegrass</b>              |        |   | 34–170  |   |
|             | needle and thread               | HECOC8 | <i>Hesperostipa comata</i> ssp. <i>comata</i>               | 34–170  | – |
|             | green needlegrass               | NAVI4  | <i>Nassella viridula</i>                                    | 0–85    | – |
| 4           | <b>Grama</b>                    |        |   | 17–85   |   |
|             | blue grama                      | BOGR2  | <i>Bouteloua gracilis</i>                                   | 17–85   | – |
| 5           | <b>Other Native Grasses</b>     |        |   | 85–255  |   |
|             | slender wheatgrass              | ELTR7  | <i>Elymus trachycaulus</i>                                  | 17–119  | – |
|             | Fendler threeawn                | ARPUL  | <i>Aristida purpurea</i> var. <i>longiseta</i>              | 17–85   | – |
|             | sand dropseed                   | SPCR   | <i>Sporobolus cryptandrus</i>                               | 17–85   | – |
|             | Grass, perennial                | 2GP    | <i>Grass, perennial</i>                                     | 0–68    | – |
|             | Scribner's rosette grass        | DIOLS  | <i>Dichanthelium oligosanthos</i> var. <i>scribnerianum</i> | 17–34   | – |
|             | prairie Junegrass               | KOMA   | <i>Koeleria macrantha</i>                                   | 17–34   | – |
|             | little bluestem                 | SCSC   | <i>Schizachyrium scoparium</i>                              | 0–17    | – |
| 6           | <b>Grass-Likes</b>              |        |   | 51–170  |   |
|             | threadleaf sedge                | CAFI   | <i>Carex filifolia</i>                                      | 34–170  | – |
|             | sun sedge                       | CAINH2 | <i>Carex inops</i> ssp. <i>heliophila</i>                   | 17–51   | – |
|             | Grass-like (not a true grass)   | 2GL    | <i>Grass-like (not a true grass)</i>                        | 0–51    | – |
| 7           | <b>Non-Native Grasses</b>       |        |   | 255–425 |   |
|             | Kentucky bluegrass              | POPR   | <i>Poa pratensis</i>  | 85–340  | – |
|             | smooth brome                    | BRIN2  | <i>Bromus inermis</i>                                       | 34–255  | – |
|             | cheatgrass                      | BRTE   | <i>Bromus tectorum</i>                                      | 17–170  | – |
|             | crested wheatgrass              | AGCR   | <i>Agropyron cristatum</i>                                  | 0–85    | – |
| <b>Forb</b> |                                 |        |   |         |   |
| 8           | <b>Forbs</b>                    |        |   | 85–170  |   |
|             | Forb, perennial                 | 2FP    | <i>Forb, perennial</i>                                      | 0–136   | – |
|             | Forb, annual                    | 2FA    | <i>Forb, annual</i>   | 0–85    | – |
|             | white sagebrush                 | ARLU   | <i>Artemisia ludoviciana</i>                                | 17–85   | – |
|             | tarragon                        | ARDR4  | <i>Artemisia dracunculus</i>                                | 17–68   | – |
|             | scurfpea                        | PSORA2 | <i>Psoralidium</i>  | 17–51   | – |
|             | goldenrod                       | SOLID  | <i>Solidago</i>   | 17–51   | – |
|             | white heath aster               | SYER   | <i>Symphotrichum ericoides</i>                              | 17–51   | – |
|             | upright prairie coneflower      | RACO3  | <i>Ratibida columnifera</i>                                 | 17–34   | – |
|             | blazing star                    | LIATR  | <i>Liatris</i>  | 17–34   | – |
|             | western yarrow                  | ACMIO  | <i>Achillea millefolium</i> var. <i>occidentalis</i>        | 17–34   | – |
|             | prairie clover                  | DALEA  | <i>Dalea</i>  | 17–34   | – |
|             | blacksamson echinacea           | ECAN2  | <i>Echinacea angustifolia</i>                               | 0–17    | – |
|             | sanddune wallflower             | ERCAC  | <i>Erysimum capitatum</i> var. <i>capitatum</i>             | 0–17    | – |

|                   |                     |       |                                    |        |   |
|-------------------|---------------------|-------|------------------------------------|--------|---|
|                   | scarlet beeblossom  | GACO5 | <i>Gaura coccinea</i>              | 0–17   | – |
|                   | rush skeletonplant  | LYJU  | <i>Lygodesmia juncea</i>           | 0–17   | – |
|                   | purple locoweed     | OXLA3 | <i>Oxytropis lambertii</i>         | 0–17   | – |
|                   | beardtongue         | PENST | <i>Penstemon</i>                   | 0–17   | – |
|                   | milkvetch           | ASTRA | <i>Astragalus</i>                  | 0–17   | – |
|                   | wavyleaf thistle    | CIUN  | <i>Cirsium undulatum</i>           | 0–17   | – |
|                   | scarlet globemallow | SPCO  | <i>Sphaeralcea coccinea</i>        | 0–17   | – |
| <b>Shrub/Vine</b> |                     |       |                                    |        |   |
| 9                 | <b>Shrubs</b>       |       |                                    | 85–170 |   |
|                   | prairie sagewort    | ARFR4 | <i>Artemisia frigida</i>           | 17–85  | – |
|                   | rose                | ROSA5 | <i>Rosa</i>                        | 17–85  | – |
|                   | western snowberry   | SYOC  | <i>Symphoricarpos occidentalis</i> | 17–85  | – |
|                   | Subshrub (<.5m)     | 2SUBS | <i>Subshrub (&lt;.5m)</i>          | 0–34   | – |
|                   | pricklypear         | OPUNT | <i>Opuntia</i>                     | 0–17   | – |

## Animal community

Wildlife Interpretations:  
Under development.

Grazing Interpretations:

This site is well adapted to managed grazing by domestic livestock. The predominance of herbaceous plants across all plant community phases best lends these sites to grazing by cattle but other domestic grazers with differing diet preferences may also be a consideration depending upon management objectives. Often, the current plant community does not entirely match any particular plant community (as described in the ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of this inventory data will permit the establishment of a safe, initial stocking rate for the type and class of animals and level of grazing management. More accurate stocking rate estimates should eventually be calculated using actual stocking rate information and monitoring data.

## Hydrological functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group D. Infiltration varies from moderate to slow and runoff potential varies from medium to high depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses form a dense sod and dominate the site. 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 opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

## Wood products

No appreciable wood products are present on the 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 and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field-tested by various private, state and federal agency specialists. Those involved in developing this site description include: Stan Boltz, NRCS Range Management Specialist; Michael D. Brand, State Land Dept., Director Surface Management; David Dewald, NRCS State Biologist; Paul Drayton, NRCS District Conservationist; Jody Forman, NRCS Range Management Specialist; Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Kevin Sedivec, Extension Rangeland Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; and Lee Voigt, NRCS Range Management Specialist.

Data Source Number of Records Sample Period State County

SCS-RANGE-417

Ocular Estimate 1 2003 SD McPherson

## Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.  
(<http://hprcc.unl.edu>)

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

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

## Contributors

Jeff Printz

Jeff Printz/Stan Boltz

## Approval

Suzanne Mayne-Kinney, 1/11/2024

## 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)                    | Jeff Printz, Stan Boltz, Lee Voigt, Jody Forman |
| Contact for lead author                     | Jeff.printz@nd.usda.gov 701-530-2080            |
| Date  | 03/02/2012                                      |
| Approved by                                 | Suzanne Mayne-Kinney                            |
| Approval date                               |   |
| Composition (Indicators 10 and 12) based on | Annual Production                               |

## Indicators

1. **Number and extent of rills:** None.  

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2. **Presence of water flow patterns:** None.  

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3. **Number and height of erosional pedestals or terracettes:** None.  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 5 to 20 percent. Patch size is 2 inches or less and not connected.  

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5. **Number of gullies and erosion associated with gullies:** None.  

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.  

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7. **Amount of litter movement (describe size and distance expected to travel):** None.  

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Average 5 to 6. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil series description for depth, color and structure of A horizon/surface layer.  

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.  

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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 evident. Naturally occurring compaction layer ("claypan") and some platy surface structure is expected for this site.  

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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: Mid, cool-season rhizomatous grasses >  
  
Sub-dominant: Tall, warm-season grasses = mid, cool-season bunchgrasses  
  
Other: Short, warm-season grasses = grass-likes = forbs > shrubs > short, cool-season grasses = mid, warm-season grasses

Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass do not fit into reference plant community F/S groups.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** No plant mortality or decadence expected.
- 

14. **Average percent litter cover (%) and depth ( in):** Plant litter is in contact with soil surface.
- 

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 2200 lbs./ac air dry with a range of 1600 to 2800 lbs./ac air dry depending upon growing conditions.
- 

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:** State and local noxious weeds, 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 should have vigorous rhizomes or tillers.
-