Natural Resources
Conservation Service

# Ecological site R058BY266WY
# Shallow Sandy (SwSy) 15-17” PZ

Last updated: 12/10/2024
Accessed: 05/13/2025

## 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.

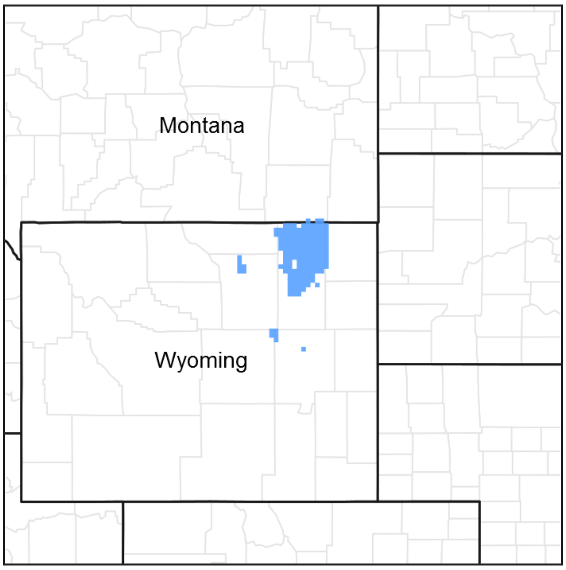



**Figure 1. Mapped extent**

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.

## MLRA notes

Major Land Resource Area (MLRA): 058B–Northern Rolling High Plains, Southern Part

MLRA 58B is located in northeastern Wyoming (95 percent) and extreme southeastern Montana (5 percent). It is comprised of sedimentary plains, scoria hills, and river valleys. The major rivers include the Powder, Tongue, Belle Fourche, Cheyenne, and North Platte. Tributaries include the Little Powder River, Little Missouri River, Clear Creek, Crazy Woman Creek, and others. This MLRA is traversed by Interstates 25 and 90, and U.S. Highways 14 and 16. The extent of MLRA 58B covers approximately 12.3 million acres. Major land uses include rangeland (approximately 93 percent), cropland, pasture, and hayland (approximately 2 percent), and forest, urban, and miscellaneous uses (approximately 5 percent). Cities include Buffalo, Casper, Sheridan, and Gillette, WY. Land ownership is mostly private. Federal lands include the Thunder Basin National Grassland (U.S. Forest Service) and lands administered by the Bureau of Land Management. Areas of interest in MLRA 58B in Wyoming include Fort Phil Kearny State Historic Site, Glendo State Park, and Lake DeSmet. The elevations in MLRA 58B increase gradually from north to south and range from approximately 2,900 to 5,900 feet. A few buttes are higher than 6,800 feet. The average annual precipitation in this area ranges from 10 to 17 inches per year. Precipitation occurs mostly during the growing season, often during rapidly developing thunderstorms. Mean annual air temperature is 46 degrees Fahrenheit. Summer temperatures may exceed 100 degrees Fahrenheit. Winter temperatures may drop to below zero. Snowfall averages 45 inches per year, but varies from 25 to over 70 inches in some locales.

## Classification relationships

USDA Natural Resources Conservation Service (NRCS):
Land Resource Region–G Western Great Plains Range and Irrigation; Major Land Resource Area (MLRA)–58B Northern Rolling High Plains, Southern Part (USDA, 2006)

Relationship to Other Classifications:

USDA Forest Service (FS) Classification Hierarchy:

Province–331 Great Plains-Palouse Dry Steppe; Section–331G-Powder River Basin; Subsections–331Gb Montana Shale Plains, 331Ge Powder River Basin, 331Gf South Powder River Basin-Scoria Hills (Cleland et al, 1997)

Environmental Protection Agency (EPA) Classification Hierarchy:

Level III Ecoregion–43 Northwestern Great Plains; Level IV Ecoregion–43p Scoria Hills, 43q Mesic-Dissected Plains, 43w Powder River Basin (EPA, 2013)
https://www.epa.gov/eco-research/ecoregions

## Ecological site concept

The Shallow Sandy 15-17" PZ occurs on nearly level to steeply sloping hills and ridges, on sedimentary plains or uplands. Primary production is from cool-season midgrasses (bunch and rhizomatous), warm-season midgrasses (bunch), and secondary warm-season shortgrasses. There is also lesser component of forbs and shrubs. Soils are shallow (10 to 20 inches) to a restrictive layer, generally sandstone bedrock.

## Associated sites

| | |
|---|---|
| R058BY250WY | **Sandy (Sy) 15-17" PZ**<br>Sandy 15-17 is higher production with mod to very deep soils. Sandy occurs lower on the landform or on lower sloping positions further from the bedrock parent material. |

## Similar sites

| | |
|---|---|
| R058BY166WY | **Shallow Sandy (SwSy) 10-14" PZ**<br>Shallow Sandy 10-14" PZ has lower production. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Atriplex canescens* |
| Herbaceous | (1) *Hesperostipa comata*<br>(2) *Calamovilfa longifolia* |

## Physiographic features

This site occurs on nearly level to steeply sloping hills and ridges, on sedimentary plains or uplands.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Hill<br>(2) Ridge |
| Runoff class | Negligible to medium |
| Flooding frequency | None |
| Ponding frequency | None |

| | |
|---|---|
| Elevation | 1,036–1,920 m |
| Slope | 0–45% |
| Water table depth | 203 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The average annual precipitation ranges from 10 to 17 inches per year across MLRA 58B. There are two Precipitation Zones (PZs). The 10 to 14 inch precipitation zone is predominant across the MLRA, including portions of Sheridan, Johnson, and Natrona Counties; portions of Campbell and Converse Counties; and smaller portions of Weston and Niobrara Counties. The 15 to 17 inch precipitation zone occurs in northern and eastern portions of the MLRA, including portions of Sheridan, Campbell, and western Crook Counties. Wide fluctuations in precipitation may occur from year to year, and occasional periods of extended drought (longer than one year in duration) can be expected. Two-thirds of the annual precipitation occurs during the growing season from May through September. Mean Annual Air Temperature (MAAT) is 46 degrees Fahrenheit. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may also occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranching operations during late winter and spring. High-intensity afternoon thunderstorms may occur during the summer. Annual wind speeds average about 5 mph. Daytime winds are generally stronger than nighttime winds. Occasional strong storms may bring brief periods of high winds with gusts of more than 75 mph. The average length of the freeze-free period (28 degrees Fahrenheit) is 125 days and generally occurs from May 16 to September 19. The average frost-free period (32 degrees Fahrenheit) is 101 days and generally occurs from June 1 to September 9.

The growth of native cool-season plants begins in late April to early May with peak growth occurring in mid to late June. Native warm-season plants begin growth in late May to early June and continue into August. Regrowth of cool-season plants occurs in September in most years, depending upon moisture.

Note: The climate described here is based on historic climate station data and is averaged to provide an overview of the annual precipitation, temperatures, and growing season. Future climate is beyond the scope of this document. However, research to determine the effects of elevated CO2 and heating on mixed-grass prairie ecosystems, and how it may relate to future plant communities, is ongoing.

For detailed information, or to find a specific climate station, visit the Western Regional Climate Center (WRCC) website: Western Regional Climate Center, Historical Data, Western U.S. Climate summaries, NOAA Coop Stations, Wyoming (Note: Montana climate stations are also listed under the Wyoming link).
https://wrcc.dri.edu/summary/Climsmwy.html

Wind speed averages can be found at the WRCC home page, under the Specialty Climate tab: https://wrcc.dri.edu/

The following tables represent area-wide climate data for the 15 to 17 inch precipitation zone:

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (characteristic range) | 88-105 days |
| Freeze-free period (characteristic range) | 122-130 days |
| Precipitation total (characteristic range) | 381-406 mm |
| Frost-free period (actual range) | 83-109 days |
| Freeze-free period (actual range) | 119-130 days |
| Precipitation total (actual range) | 381-432 mm |
| Frost-free period (average) | 101 days |
| Freeze-free period (average) | 125 days |
| Precipitation total (average) | 381 mm |

## Climate stations used

- (1) BIDDLE 8 SW [USC00240743], Biddle, MT
- (2) DOUGLAS 1 SE [USC00482685], Douglas, WY
- (3) GILLETTE 4SE [USC00483855], Gillette, WY
- (4) LEITER 9N [USC00485506], Clearmont, WY
- (5) DILLINGER [USC00482580], Gillette, WY
- (6) SHERIDAN CO AP [USW00024029], Sheridan, WY

## Influencing water features

This upland ecological site is not influenced by a water table or run in from adjacent sites. Due to the semi-arid climate in which it occurs, the water budget is normally contained within the soil pedon. Soil moisture is recharged by spring rains, but it rarely exceeds field capacity in the upper 20 inches before being depleted by evapotranspiration. During intense precipitation events, precipitation rates frequently exceed infiltration rates and the site delivers moisture to downslope sites through surface runoff. Moisture loss through evapotranspiration exceeds precipitation for a majority of the growing season. Soil moisture is the primary limiting factor for vegetative production on this ecological site.

## Wetland description

N/A

## Soil features

The soils on this site are well drained to excessively drained, shallow to bedrock and formed slope alluvium and residuum weathered from sandstone. They typically have a moderately rapid to rapid permeability class, but range to very rapid in some soils. The available water capacity is typically very low. The surface layer of the soils in this site are typically fine sandy loam or sandy loam but may include loamy fine sand or loamy sand. The surface layer ranges from a depth of 1 to 4 inches thick. The subsoil is typically fine sandy loam or sandy loam. Soils in this site typically have carbonates at the surface; but some soils may be leached as deep as 6 inches. These soils are susceptible to erosion by water and wind. The potential for water erosion accelerates with increasing slope. The soil moisture regime is typically aridic ustic. The soil temperature regime is mesic or frigid.

Major soil series correlated to this ecological site include: Mittenbutte, Niobrara

The attributes listed below represent 0-40 inches in depth or to the first restrictive layer.

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Slope alluvium–sandstone<br>(2) Residuum–sandstone<br>(3) Eolian deposits |
| Surface texture | (1) Fine sandy loam<br>(2) Sandy loam<br>(3) Loamy fine sand<br>(4) Loamy sand |
| Drainage class | Well drained to excessively drained |
| Permeability class | Moderately rapid to rapid |
| Soil depth | 25–51 cm |
| Available water capacity<br>(Depth not specified) | 2.03–5.08 cm |
| Calcium carbonate equivalent<br>(Depth not specified) | 0–10% |

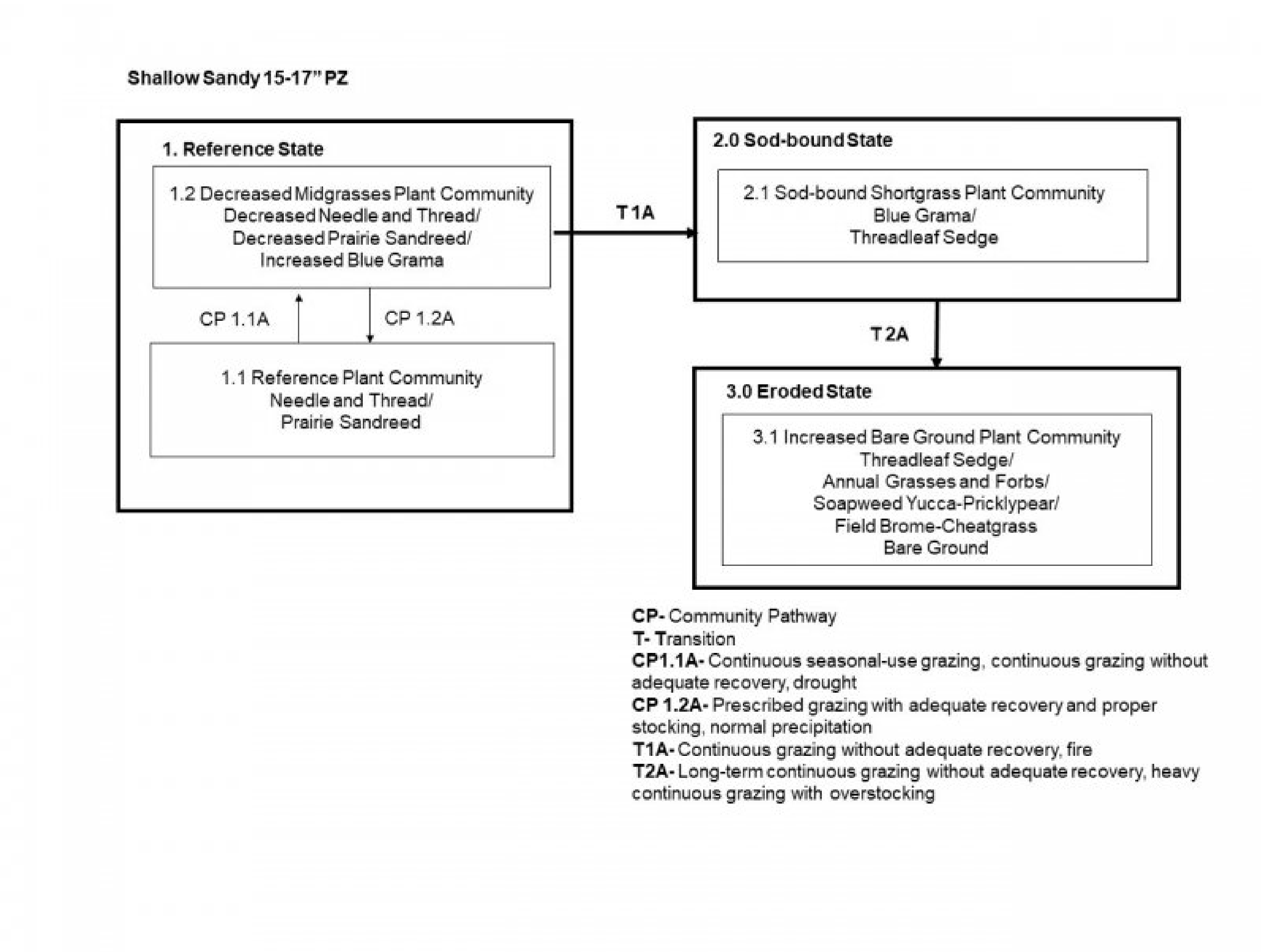
| | |
|---|---|
| Electrical conductivity (Depth not specified) | 0–2 mmhos/cm |
| Sodium adsorption ratio (Depth not specified) | 0–3 |
| Soil reaction (1:1 water) (Depth not specified) | 6.6–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–10% |
| Subsurface fragment volume >3" (Depth not specified) | 0–5% |

## Ecological dynamics

The Reference state is the plant communities in which interpretations are primarily based and is used as a reference in order to understand the original potential of the site. The Reference state evolved under the combined influences of climatic conditions, periodic fire activity, grazing by large herbivores, and impacts from small mammals and insects. Changes may occur to the Reference state due to management actions such as continuous season-long or year-long grazing, increased stocking rates, climatic conditions such as drought, and natural events such as multiple fires in close succession. The Reference state is characterized by cool-season bunch midgrass and warm-season rhizomatous midgrass. Secondary grasses are warm-season mid- and shortgrasses, and cool-season rhizomatous midgrasses. A lesser component of forbs and shrubs are also present. The Reference state is not necessarily the management goal, as other vegetative states may be considered desired plant communities as long as critical resource concerns are met.

In addition to the Reference state, other plant communities can occur on this site and are usually the result of historic management practices. Grazing practices such as continuous season-long or year-long grazing, heavier stocking rates, or a combination of these factors on this ecological site results in bunchgrasses such as needle and thread decreasing in both frequency and production. Grasses such as blue grama, threadleaf sedge, and sixweeks fescue will increase. Under continued frequent and severe defoliation with no rest periods, rhizomatous wheatgrasses will also begin to decrease. Forbs and shrubs such as curlycup gumweed, western ragweed, hairy false goldenaster, pricklypear, and broom snakeweed also will increase. If continued, the plant community will become sod-bound, and all midgrasses may eventually be removed from the plant community. Over the long-term, this continuous use in combination with high stock densities, will result in broken sod with areas of bare ground developing, and species such as broom snakeweed, prickly pear, and annual forbs increasing, and non-native species invading. There are various transitional stages which may occur on this ecological site. The information presented is representative of a dynamic set of plant communities that illustrate the complex interaction of several ecological processes.

## State and transition model




## State 1
## Reference

The Reference state is characterized by two distinct plant communities: Skunkbush Sumac, Yucca, Prairie Sandreed, and Needle and Thread and Skunkbush Sumac, Yucca, Prairie Sandreed, and Blue Grama communities. The plant communities, and various successional stages between them, represent the natural range of variability within the Reference state.

## Community 1.1
## Skunkbush Sumac, Yucca, Prairie Sandreed, and Needle and Thread

This community developed with grazing by large herbivores and is suited to grazing by domestic livestock. Historically, fires likely occurred infrequently, and were randomly distributed. This plant community can be found on areas where grazed plants receive adequate periods of recovery during the growing season. The potential vegetation is about 75 percent grasses and grass-likes,15 percent forbs, and 10 percent woody plants (total pounds per acre air-dry). The Skunkbush Sumac, Yucca, Prairie Sandreed, and Needle and Thread community consists predominantly of needle and thread and prairie sandreed. Secondary grasses are western wheatgrass, thickspike wheatgrass, and blue grama. Minor grasses and grasslikes that may occur include Indian ricegrass, prairie Junegrass, threadleaf sedge, and sand dropseed. A variety of forbs such as scarlet globemallow, lemon scurfpea, Indian breadroot, textile onion, and biscuitroot; half-shrubs such as silver sagebrush, and shrubs such big sagebrush and yellow rabbitbrush also occur. Plant diversity is high. In the Shallow Sandy 15 to 17 inch Precipitation Zone (PZ) ecological site, the total annual production (air-dry weight) is about 1,300 pounds per acre during an average year, but it can range from about 1,000 pounds per acre in unfavorable years to about 1,600 pounds per acre in above-average years. Defoliation levels should be determined as part of a grazing management plan based on objectives. Nutrient and water cycles, and energy flow are functioning properly. Infiltration rates are moderate, and soil erosion is low. Litter is properly distributed where vegetative cover is continuous. Plant decadence and natural plant mortality are low. This community is resistant to many disturbances except excessive grazing, and/or development into urban or other uses.

**Table 5. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 1177 | 1530 | 1883 |
| Shrub/Vine | 280 | 364 | 448 |
| Forb | 168 | 219 | 269 |
| **Total** | **1625** | **2113** | **2600** |

**Figure 9. Plant community growth curve (percent production by month). WY1401, 10-14NP upland sites.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 10 | 30 | 35 | 10 | 5 | 5 | 5 | 0 | 0 |

## Community 1.2
## Skunkbush Sumac, Yucca, Prairie Sandreed, and Blue Grama

This plant community developed with excessive grazing without adequate recovery opportunity during the growing season. The plant community has a reduced component of midgrasses with an understory of short sod-forming grasses. Dominant grasses include needle and thread, blue grama, and prairie sandreed. A cool-season/warm-season shift may occur depending upon the pre-dominant season of use. Recurrent excessive grazing in the spring, over time, will eventually reduce the cool-season grasses such as needle and thread and the rhizomatous wheatgrasses. Likewise, recurrent excessive grazing in the summer will reduce the warm-season midgrasses such as prairie sandreed and little bluestem. The significant forbs include dotted blazing star (also known as dotted gayfeather), scarlet globemallow, and upright prairie coneflower. Shrubs in this community include prairie sagewort (also known as fringed sagewort) and broom snakeweed. Compared to the community 1.1, blue grama and threadleaf sedge have increased. All the midgrass species are present but in lesser amounts, especially the bunchgrasses. Plant diversity is moderate. The risk of losing key midgrasses and important forbs and shrubs is a major concern. Prescribed grazing with adequate recovery periods between grazing events will maintain the vegetation or move it toward community 1.1. Natural disturbances such as drought or fire can contribute to this shift. In the Shallow Sandy 15 to 17 inch Precipitation Zone ecological site, the total annual production (air-dry weight) is about 1,100 pounds per acre during an average year, but it can range from about 800 pounds per acre in unfavorable years to about 1,300 pounds per acre in above-average years. Total aboveground biomass has been reduced. Reduction of rhizomatous wheatgrasses, nitrogen-fixing forbs, and increased warm-season shortgrasses have begun to alter the biotic integrity of this community. Water and nutrient cycles may be impaired. Nearly all plant species typically found in the Reference Plant Community are present and will respond to changes in grazing management.

**Figure 10. Plant community growth curve (percent production by month). WY5803, Northern Rolling High Plains, Southern Part, 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 1.1A
## Community 1.1 to 1.2

Excessive grazing without adequate recovery between grazing events, or frequent and severe defoliation, and drought can shift community 1.1 toward community 1.2. Over a period of years, plant species less tolerant to frequent and severe defoliation will begin to decrease, and those more tolerant will begin to increase. Biotic integrity and water and nutrient cycles may become impaired because of this community pathway.

## Pathway 1.2A
## Community 1.2 to 1.1

Grazing that allows for adequate recovery between grazing events, along with proper stocking rates, shift community 1.2 back toward community 1.1. Natural disturbances such as return to normal precipitation will contribute to this shift.

## State 2
## Sod Bound

This state is characterized by the sod-bound shortgrass plant community. An ecological threshold has been crossed and a significant amount of production and diversity has been lost when compared to the Reference state. Significant biotic and soil changes have negatively impacted energy flow, and nutrient and hydrologic cycles. This is a very stable state, resistant to change due to the high tolerance of blue grama and threadleaf sedge to grazing, the development of a shallow root system (root pan) and subsequent changes in hydrology and nutrient cycling. Loss of other functional/structural groups such as cool-season bunch- and rhizomatous grasses, forbs, and shrubs, reduces the biodiversity productivity of this site.

## Community 2.1
## Skunkbush Sumac, Yucca, Threadleaf Sedge, Blue Grama, Hairy False Goldenaster, and Cuman Ragweed

The Skunkbush Sumac, Yucca, Threadleaf Sedge, Blue Grama, Hairy False Goldenaster, and Cuman Ragweed community develops under long-term frequent and severe defoliation. This typically occurs when the community has been excessively grazed with heavy stocking rates, throughout the growing season over a period of many years. Initially, this plant community is dominated by sod-forming grasses and grass-likes, such as blue grama and threadleaf sedge, with remnants of midgrasses such as prairie sandreed, and some rhizomatous wheatgrasses. Forbs include Cuman ragweed (western ragweed), lemon scurfpea, hairy false goldenaster, and skeletonplant. Shrubs such as prairie (fringed) sagewort, broom snakeweed, and pricklypear continue to increase. Under long-term frequent and severe defoliation, blue grama and threadleaf sedge have become sod-bound in localized colonies and exhibit a mosaic appearance. Other minor grasses are sand dropseed, purple threeawn, and annuals. The midgrasses and palatable forbs have been eliminated. Plant diversity is very low. Energy flow and the water and mineral cycles have been negatively affected. Litter levels are very low and unevenly distributed. In the Shallow Sandy 15 to 17 inch Precipitation Zone ecological site, the total annual production (air-dry weight) is about 600 pounds per acre during an average year, but it can range from about 400 pounds per acre in unfavorable years to about 750 pounds per acre in above-average years. This community is extremely resistant to change. Many plant species are missing, and a seed source is not readily available. Also, sod-forming grasses tend to maintain themselves due to their resistance to any further overgrazing.

**Figure 11. Plant community growth curve (percent production by month). WY5803, Northern Rolling High Plains, Southern Part, 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 | | |

## State 3
## Eroded

The Eroded state develops with heavy, excessive grazing with overstocking, or frequent and severe defoliation. An ecological threshold has been crossed. Soil erosion and loss of organic matter and carbon reserves are resource concerns.

## Community 3.1
## Skunkbush Sumac, Yucca, Cheatgrass, Hairy False Goldenaster, and Cuman Ragweed

The Skunkbush Sumac, Yucca, Cheatgrass, Hairy False Goldenaster, and Cuman Ragweed community occurs where the rangeland is grazed year-round at high stock densities. Physical impact such as trampling, soil compaction, and trailing typically contribute to this transition. The plant composition is made of annuals with a few species of perennial forbs and grasses that are very tolerant to frequent and severe defoliation. The dominant grasses include blue grama, threadleaf sedge, and purple threeawn. Annual grasses and forbs such as cheatgrass, sixweeks fescue, Russian thistle, and kochia have increased or invaded. The dominant forbs include curlycup gumweed, Cuman (western) ragweed, and hairy false goldenaster. Soapweed yucca, pricklypear, snakeweed, and prairie (fringed) sagewort, will increase. In the Shallow Sandy 15 to 17 inch Precipitation Zone ecological site, the total annual production (air-dry weight) is about 500 pounds per acre during an average year, but it can range from about 300 pounds per acre in unfavorable years to about 650 pounds per acre in above-average years. The hazard of soil erosion has increased due to the increase of bare ground. Runoff is typically high, and infiltration is low. All ecological functions are impaired. Desertification is advanced.

**Figure 12. Plant community growth curve (percent production by month). WY5803, Northern Rolling High Plains, Southern Part, 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 | | |

### Transition T1A
### State 1 to 2

Excessive grazing without adequate recovery periods, or frequent and severe defoliation, will shift this plant community across an ecological threshold toward the Sod Bound state. Biotic integrity and hydrologic function will be impaired as because of this transition.

### Transition T2A
### State 2 to 3

Long-term excessive grazing or frequent and severe defoliation, without adequate recovery between grazing events, or heavy, excessive grazing with overstocking, will cause a shift across an ecological threshold to the Eroded state. Non-native annual bromes begin to invade in this transition.

## Additional community tables

**Table 6. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Grass/Grasslike** | | | | | |
| 1 | **Cool-Season Rhizomatous** | | | 112–179 | |
| | thickspike wheatgrass | ELLAL | *Elymus lanceolatus ssp. lanceolatus* | 112–179 | 1–10 |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 112–179 | 1–10 |
| 2 | **Cool-Season Bunch Midgrasses** | | | 448–717 | |
| | needle and thread | HECO26 | *Hesperostipa comata* | 280–448 | 10–25 |
| | bluebunch wheatgrass | PSSP6 | *Pseudoroegneria spicata* | 112–179 | 1–10 |
| | Indian ricegrass | ACHY | *Achnatherum hymenoides* | 56–90 | 1–5 |
| 3 | **Warm-Season Bunch Midgrasses** | | | 224–359 | |
| | sideoats grama | BOCU | *Bouteloua curtipendula* | 112–179 | 1–10 |
| | little bluestem | SCSC | *Schizachyrium scoparium* | 112–179 | 1–10 |
| 4 | **Warm-Season Rhizomatous Grasses** | | | 224–359 | |
| | prairie sandreed | CALO | *Calamovilfa longifolia* | 224–359 | 10–20 |
| 5 | **Miscellaneous** | | | 168–269 | |
| | sun sedge | CAINH2 | *Carex inops ssp. heliophila* | 56–90 | 1–5 |
| | purple threeawn | ARPU9 | *Aristida purpurea* | 56–90 | 1–5 |

| | | | | | |
|---|---|---|---|---|---|
| | purple threeawn | ARPU9 | *Aristida purpurea* | 56–90 | 1–5 |
| | hairy grama | BOHI2 | *Bouteloua hirsuta* | 56–90 | 1–5 |
| | prairie Junegrass | KOMA | *Koeleria macrantha* | 56–90 | 1–5 |
| | Sandberg bluegrass | POSE | *Poa secunda* | 56–90 | 1–5 |
| | sand bluestem | ANHA | *Andropogon hallii* | 56–90 | 1–5 |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 56–90 | 1–5 |
| | threadleaf sedge | CAFI | *Carex filifolia* | 56–90 | 1–5 |
| | Grass, perennial | 2GP | *Grass, perennial* | 56–90 | 1–5 |
| | plains muhly | MUCU3 | *Muhlenbergia cuspidata* | 56–90 | 1–5 |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 56–90 | 1–5 |
| **Forb** | | | | | |
| 6 | **Forbs** | | | 168–269 | |
| | common yarrow | ACMI2 | *Achillea millefolium* | 56–90 | 1–5 |
| | stemless mock goldenweed | STAC | *Stenotus acaulis* | 56–90 | 1–5 |
| | sulphur-flower buckwheat | ERUM | *Eriogonum umbellatum* | 56–90 | 1–5 |
| | scarlet beeblossom | GACO5 | *Gaura coccinea* | 56–90 | 1–5 |
| | aster | ASTER | *Aster* | 56–90 | 1–5 |
| | desertparsley | LOMAT | *Lomatium* | 56–90 | 1–5 |
| | large Indian breadroot | PEES | *Pediomelum esculentum* | 56–90 | 1–5 |
| | rosy pussytoes | ANRO2 | *Antennaria rosea* | 56–90 | 1–5 |
| | purple prairie clover | DAPU5 | *Dalea purpurea* | 56–90 | 1–5 |
| | white prairie clover | DACA7 | *Dalea candida* | 56–90 | 1–5 |
| | dotted blazing star | LIPU | *Liatris punctata* | 56–90 | 1–5 |
| | textile onion | ALTE | *Allium textile* | 56–90 | 1–5 |
| | American vetch | VIAM | *Vicia americana* | 56–90 | 1–5 |
| | milkvetch | ASTRA | *Astragalus* | 56–90 | 1–5 |
| | spiny phlox | PHHO | *Phlox hoodii* | 56–90 | 1–5 |
| | lemon scurfpea | PSLA3 | *Psoralidium lanceolatum* | 56–90 | 1–5 |
| | tapertip hawksbeard | CRAC2 | *Crepis acuminata* | 56–90 | 1–5 |
| | Forb, perennial | 2FP | *Forb, perennial* | 56–90 | 1–5 |
| | scarlet globemallow | SPCO | *Sphaeralcea coccinea* | 56–90 | 1–5 |
| **Shrub/Vine** | | | | | |
| 7 | **Shrubs** | | | 252–398 | |
| | fourwing saltbush | ATCA2 | *Atriplex canescens* | 112–179 | 1–10 |
| | yellow rabbitbrush | CHVI8 | *Chrysothamnus viscidiflorus* | 56–90 | 1–5 |
| | winterfat | KRLA2 | *Krascheninnikovia lanata* | 56–90 | 1–5 |
| | skunkbush sumac | RHTR | *Rhus trilobata* | 56–90 | 1–5 |
| | soapweed yucca | YUGL | *Yucca glauca* | 56–90 | 1–5 |
| | Shrub (>.5m) | 2SHRUB | *Shrub (>.5m)* | 56–90 | 1–5 |
| | Subshrub (<.5m) | 2SUBS | *Subshrub (<.5m)* | 56–90 | 1–5 |
| | silver sagebrush | ARCA13 | *Artemisia cana* | 56–90 | 1–5 |
| | Wyoming big sagebrush | ARTRW8 | *Artemisia tridentata ssp. wyomingensis* | 56–90 | 1–5 |

| | | | | | |
|---|---|---|---|---|---|
| | prairie sagewort | ARFR4 | *Artemisia frigida* | 56–90 | 1–5 |
| **Tree** | | | | | |
| 8 | **Trees** | | | 28–50 | |
| | ponderosa pine | PIPO | *Pinus ponderosa* | 28–50 | 1–5 |
| | Rocky Mountain juniper | JUSC2 | *Juniperus scopulorum* | 28–50 | 1–5 |

## Animal community

Animal Community – Wildlife Interpretations (from 2001 ESD; will be revised in future updates)

Needleandthread/ Prairie sandreed (Reference): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. When found adjacent to sagebrush-dominated states, this plant community may provide brood rearing and foraging areas for sage grouse, as well as lek sites. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland-obligate small mammals would occur here.

Needle and thread/ Threadleaf sedge/ Broom snakeweed: These communities provide foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover. Generally, these are not target plant communities for wildlife habitat management.

Threadleaf sedge/Fringed sagewort/Yucca: These communities provide limited foraging for antelope and other grazers due to low production. They may be used as a foraging site by sage grouse if proximal to woody cover. Generally, these are not target plant communities for wildlife habitat management.

Animal Community – Grazing Interpretations (updated in 2019 Provisional revision)

The following table is a guide to stocking rates for the plant communities described in the Shallow Sandy 15 to 17 inch Precipitation Zone ecological site. These are conservative estimates for initial planning. On-site conditions will vary, and stocking rates should be adjusted based on range inventories, animal kind and class, forage availability (adjusted for slope, distance to water), and the type of grazing system (number of pastures, planned moves, etc.), all of which is determined in the conservation planning process.

The following stocking rates are based on the total annual forage production in a normal year multiplied by 25 percent harvest efficiency of preferred and desirable forage species, divided by 912 pounds of ingested air-dry vegetation for an animal unit per month (Natl. Range and Pasture Handbook, 1997). An animal unit month is defined as the amount of forage required by one livestock animal, with or without one calf, for one month, and is shortened to AUM.

Example:
1,300 lbs. per acre X 25% Harvest Efficiency = 325 lbs. forage demand for one month. 325 lbs. per acre/912 demand per AUM =.36

Plant Community (PC) Production (total lbs./acre in a normal year) and Stocking Rate (AUM/acre) are listed below:

Reference Plant Community 1000-1600 .35
Threadleaf sedge/Needleandthread/Broom snakeweed 700-1000 .2
Threadleaf sedge/Fringed sagewort/Yucca 400-700 .1

Increased Bare Ground PC (*) (*)

* Highly variable stocking rates must be determined on site.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide year-long forage under prescribed grazing for cattle, sheep, horses, and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

## Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups B and C. Infiltration ranges from rapid to very rapid. Runoff potential for this site varies from low to moderate depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies should not typically be present. Water flow patterns typically, none. On steeper slopes (greater than 15%), they may be barely visible and discontinuous with numerous debris dams. Pedestalled plants and terracettes are not expected on gentle slopes but will occur on slopes steeper than 15% becoming more evident as slopes increase. Fine litter will generally move short distances (less than 6 inches), some coarse litter will move very short distances (less than 3 inches). Litter debris dams are occasionally present. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1 to 2 percent of the soil surface.

## 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

None noted.

## Other information

Site Development & Testing Plan

General Data (MLRA and Revision Notes, Hierarchical Classification, Ecological Site Concept, Physiographic, Climate, and Water Features, and Soils Data):

Updated. All “Required” items complete to Provisional level.

Community Phase Data (Ecological Dynamics, STM, Transition & Recovery Pathways, Reference Plant Community, Species Composition List, Annual Production Table):

Updated. All “Required” items complete to Provisional level.

Annual Production Table is from the “Previously Approved” ESD (2001).

The Annual Production Table and Species Composition List will be reviewed for future updates at the Approved level.

Each Alternative State/Community:

Complete to Provisional level.

Supporting Information (Site Interpretations, Assoc. & Similar Sites, Inventory Data References, Agency/State Correlation, References):

Updated. All “Required” items complete to Provisional level.

Wildlife Interpretations: Narrative is from “Previously Approved” ESD (2001). Wildlife species will need to be updated at the next Approved level.

Livestock Interpretations: Plant community names and stocking rates updated.

Hydrology, Recreational Uses, Wood Products, and Other Products carried over from previously “Approved” ESD (2001).

Existing NRI Inventory Data References updated. More field data collection is necessary to support this site concept.

Reference Sheet
Rangeland Health Reference Sheet carried over from previously “Approved” ESD (2005).
It will be updated at the next “Approved” level.

“Future work, as described in a project plan, to validate the information in this provisional ecological site description is needed. This will include field activities to collect low and medium intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.” (NI 430_306 ESI and ESD, April 2015)

## Inventory data references

Inventory information has been derived from data collection on private and federal lands by the following methods:
• Double Sampling (Determining Vegetation Production and Stocking Rates, WY-ECS-1)
• Rangeland Health (Interpreting Indicators of Rangeland Health, Version 4, 2005)
• Soil Stability (Interpreting Indicators of Rangeland Health, Version 4, 2005)
• Line Point Intercept (Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume II, 2005)
• Soil Pedon Descriptions (Field Book for Describing and Sampling Soils, Version 3, 2012)
• SCS-RANGE-417 (Production & Composition Record for Native Grazing Lands)

National Resources Inventory (NRI)
Number of Records: 1
Sample Period: 2005-2017
Counties: Niobrara

Additional reconnaissance data collection includes ocular estimates and other inventory data; vegetative clipping data for NRCS program support; field observations from experienced rangeland personnel

Data collection for this ecological site was done in conjunction with the progressive soil surveys within MLRA 58B Northern Rolling High Plains (Southern Part)

Note: Revisions to soil surveys are on-going. For the most recent updates, visit the Web Soil Survey, the official site for soils information: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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### 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) | |
| Contact for lead author | |
| Date | 04/01/2005 |
| Approved by | Kirt Walstad |
| 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:** Barely observable

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 is 35-55% occurring in small areas throughout site

5. **Number of gullies and erosion associated with gullies:** Active gullies should be restricted to areas of concentrated water flow patterns on steeper slopes

6. **Extent of wind scoured, blowouts and/or depositional areas:** Small scoured sites may be observed

7. **Amount of litter movement (describe size and distance expected to travel):** Litter movement is little to none based on topography and water flow patterns

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 55% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 3 or greater.

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

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Infiltration is rapid to very rapid

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 or soil surface crusting should be present.

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:

    Sub-dominant:

    Other:

    Additional: Mid stature Cool Season Grasses = Mid Stature Warm Season Grasses > Shrubs Forbs = Short Grasses/Grasslikes

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low

14. **Average percent litter cover (%) and depth ( in):** Average litter cover is 20-30% with depths of 0.25 to 0.5 inches

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1300 lbs./ac

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:** Threadleaf sedge, Prickly Pear, Broom Snakeweed, Yucca, and Species found on Noxious Weed List

17. **Perennial plant reproductive capability:** All species are capable of reproducing