

Ecological site R043BY466WY **Shallow Sandy (SwSy) 15-19" Northern Plains Precipitation Zone**

Accessed: 05/11/2024

General information

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

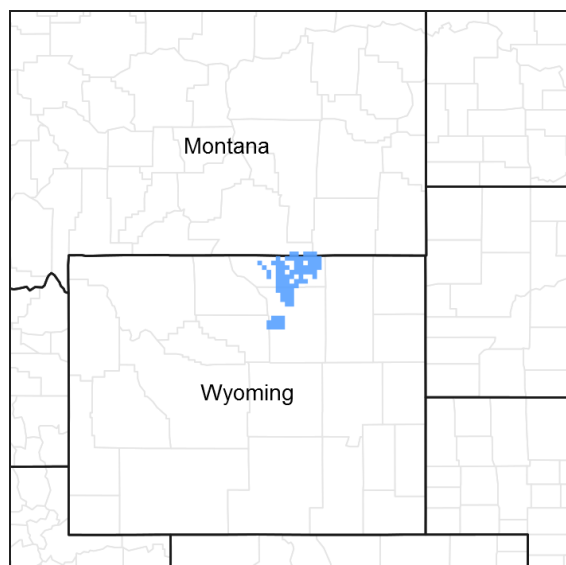


Figure 1. Mapped extent

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

Associated sites

R043BY450WY	Sandy (Sy) 15-19" Northern Plains Precipitation Zone
R043BY462WY	Shallow Loamy (SwLy) 15-19" Northern Plains Precipitation Zone

Similar sites

R058BY166WY	Shallow Sandy (SwSy) 10-14" PZ Shallow Sandy 10-14" Northern Plains P.Z., has lower production
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on steep slopes and ridge tops but may occur on any slopes.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Alluvial fan (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,128–2,286 m
Slope	20–45%
Ponding depth	0 cm
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation ranges from 15" to 19" per year. May is generally the wettest month. July, August and September are somewhat drier with daily amounts rarely exceeding one inch. Snowfall is quite heavy in the mountainous area. Annual snowfall averages close to 70 inches.

Sunshine is abundant in the latter part of the summer, the greatest amount being in July and August. Sunshine possibility during these two months averages 70 to 75% possibility with only a 65% possibility for June and September. Winter averages about 40% sunshine.

Because of the varied topography, the wind will vary considerably for different parts of the area. The wind is usually much lighter at the lower elevations and in the valleys as compared with the higher terrain. The average winter wind velocity is 8.5 mph, while the summer wind velocity averages 7.5 mph. Winds during storms and on ridges may exceed 45 mph.

Temperatures show a wide range between summer and winter, and between daily maximums and minimums. Summer nights are cool and temperatures drop into the forties at most places before sunrise. Summer daytime temperatures are usually in the seventies and occasionally reach eighty, but rarely reach the mid nineties. Winters are cold with daily lows below freezing most of the time. January has the coldest temperatures with a range of near 10 deg. F at night to the mid thirties in the afternoon. Temperatures of well below zero to –30 deg. F are not uncommon in the winter months.

The growing season for the cool season plants will generally start about April 15 to May 1 and continue to about October 10.

The following information is from the "Sheridan Airport" climate station:

Frost-free period (32 °F): 95-156 days; (5 yrs. out of 10, these days will occur between May 21 – September 19)

Freeze-free period 28 °F): 116-187 days; (5 yrs. out of 10, these days will occur between May 4 – September 29)

Mean annual precipitation: 14.7 inches

Mean annual air temperature: 45.0 °F (31.2 °F Avg. Min. – 58.8 °F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include: "Parkman 5 WNW"

Table 3. Representative climatic features

Frost-free period (average)	156 days
Freeze-free period (average)	187 days
Precipitation total (average)	483 mm

Influencing water features

Stream type: None

Soil features

The soils of this site are shallow (less than 20" to bedrock) well drained, rapidly permeable and may occur on all slopes. The bedrock may be of any kind except igneous or volcanic and is virtually impenetrable to plant roots. The soil textures are a fine sandy loam or coarser. Thin ineffectual layers of other soil textures are disregarded.

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	25–51 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0–101.6cm)	1.52–3.56 cm
Calcium carbonate equivalent (0–101.6cm)	0–5%
Electrical conductivity (0–101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0–101.6cm)	0
Soil reaction (1:1 water) (0–101.6cm)	6.6–7.8
Subsurface fragment volume ≤3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0%

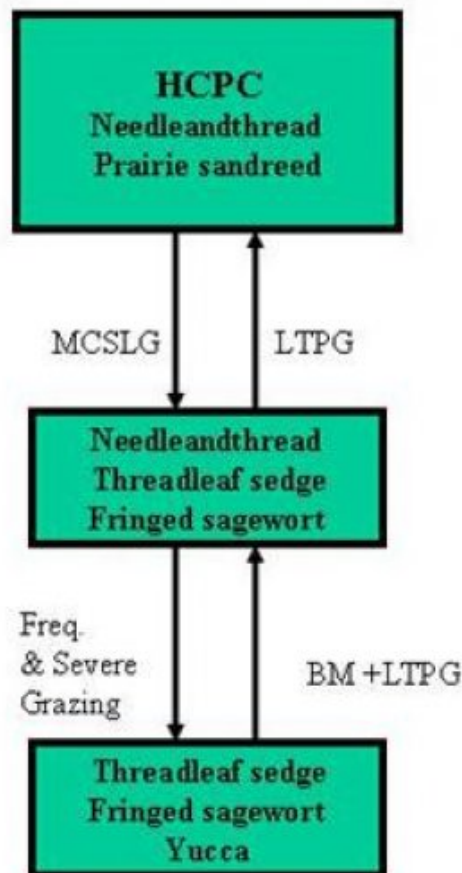
Ecological dynamics

As this site deteriorates from improper grazing management, species such as threadleaf sedge will increase. Species such as cheatgrass and broom snakeweed will invade. Mid grasses such as prairie sandreed and little bluestem will decrease in frequency and production

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

State and transition model



BM - Brush Management (fire, chemical, mechanical)

Freq. & Severe Grazing - Frequent and Severe Utilization of the Cool-season Mid-grasses during the Growing Season

GLMT - Grazing Land Mechanical Treatment

LTPG - Long-term Prescribed Grazing

MCSLG - Moderate, Continuous Season-long Grazing

NU, NF - No Use and No Fire

PG - Prescribed Grazing (proper stocking rates with adequate recovery periods during the growing season)

VLTPG - Very Long-term Prescribed Grazing (could possibly take generations)

Na - found adjacent to a saline site

State 1
Needleandthread, Prairie Sandreed Plant Community

Community 1.1
Needleandthread, Prairie Sandreed Plant Community

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. The state is a mix of warm and cool season midgrasses. The major grasses include needleandthread, prairie sandreed, little bluestem, sand bluestem and sideoats grama. Other grasses occurring on the site include bluebunch wheatgrass, Sandberg bluegrass, blue grama, Idaho fescue, rhizomatous wheatgrass, and threadleaf sedge. Annual production ranges from 900 to 1800 pounds depending on climatic conditions. The state is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allow for high drought resistance. This is a healthy and sustainable plant community (site/soil stability, watershed function, and biologic integrity). This plant community is extremely stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Moderate, improper grazing will convert the plant community to the Needleandthread, Threadleaf sedge, Fringed sagewort Vegetation State. • Long-term, heavy, improper grazing will convert the plant community to the Threadleaf sedge, Fringed sagewort, Yucca vegetation state.

Figure 4. Plant community growth curve (percent production by month).
WY1301, 15-19NP Upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	45	35	10	0	5	0	0	0

State 2
Needleandthread, Threadleaf Sedge, Fringed Sagewort Plant Community

Community 2.1
Needleandthread, Threadleaf Sedge, Fringed Sagewort Plant Community

This plant community is the result of moderate improper grazing. The understory of grass includes needleandthread, threadleaf sedge, and prairie junegrass.. When compared to the Historic Climax Plant Community prairie sandreed and little bluestem have decreased. Threadleaf sedge and needleandthread have increased. Fringed Sagewort has increased. This community is well suited to grazing by both domestic livestock and wildlife, during the spring summer and fall. Total annual production is from 700 to 1200 pounds. The communities' soil, biotic integrity and watershed are intact, although more than normal runoff may occur due to the sod forming vegetation. Transitional pathways leading to other plant communities are as follows: •Prescribed grazing over a long-term will return this state to near Historic Climax Plant Community. The sod forming nature of threadleaf sedge and needleandthread will make the transition to Historic Climax Plant Community difficult. • Heavy long-term improper use will convert this state to the threadleaf sedge, fringed sagewort, yucca vegetation state.

Figure 5. Plant community growth curve (percent production by month).
WY1301, 15-19NP Upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	45	35	10	0	5	0	0	0

State 3
Threadleaf Sedge, Fringed Sagewort, Yucca Plant Community

Community 3.1
Threadleaf Sedge, Fringed Sagewort, Yucca Plant Community

This plant community is the result of long-term, heavy, continuous, improper grazing. It is dominated by a sod of threadleaf sedge and needleandthread. Fringed sagewort and yucca have increased. Species such as cheatgrass have invaded. Production on this state is approximately 600 to 900 pounds depending on climatic conditions. The soil is generally well protected on this state. The biotic integrity may be reduced due to low vegetative production. The sod formed by these grasses is resistant to water infiltration. While the site is protected by this sod, off-site areas are affected by excessive runoff which may cause gully erosion. This sod is resistant to change and may require practices such as long-term proper grazing use to return to a mid grass community. Transitional pathways leading to other plant communities are as follows: Long-term prescribed grazing with fringed sagewort control will return this plant community to the needleandthread, threadleaf sedge, fringed sagewort plant community.

Figure 6. Plant community growth curve (percent production by month).
WY1301, 15-19NP Upland sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	45	35	10	0	5	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				392–549	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	392–549	–
2				314–471	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	314–471	–
3				157–235	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	157–235	–
4				78–157	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	78–157	–
5				78–157	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	78–157	–
6				78–157	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	78–157	–
7				78–235	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–78	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–78	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	0–78	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–78	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–78	–
	Pumpelly's brome	BRINP5	<i>Bromus inermis</i> ssp. <i>pumpellianus</i> var. <i>pumpellianus</i>	0–78	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–78	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–78	–
	Idaho fescue	FEID	<i>Festuca idahoensis</i>	0–78	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–78	–
	spike fescue	LEKI2	<i>Leucopoa kingii</i>	0–78	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–78	–

	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–78	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–78	–
Forb					
8				78–157	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–78	–
	yarrow	ACHIL	<i>Achillea</i>	0–78	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–78	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	0–78	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	0–78	–
	field chickweed	CEAR4	<i>Cerastium arvense</i>	0–78	–
	bastard toadflax	COMAN	<i>Comandra</i>	0–78	–
	prairie clover	DALEA	<i>Dalea</i>	0–78	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–78	–
	aster	EUCEP2	<i>Eucephalus</i>	0–78	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–78	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–78	–
	lupine	LUPIN	<i>Lupinus</i>	0–78	–
	bluebells	MERTE	<i>Mertensia</i>	0–78	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	0–78	–
	beardtongue	PENST	<i>Penstemon</i>	0–78	–
	phlox	PHLOX	<i>Phlox</i>	0–78	–
	stonecrop	SEDUM	<i>Sedum</i>	0–78	–
	groundsel	TEPHR3	<i>Tephrosia</i>	0–78	–
	mountain goldenbanner	THMOM3	<i>Thermopsis montana var. montana</i>	0–78	–
	American vetch	VIAM	<i>Vicia americana</i>	0–78	–
Shrub/Vine					
9				78–157	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–78	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–78	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–78	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–78	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–78	–
	yucca	YUCCA	<i>Yucca</i>	0–78	–

Animal community

Animal Community – Wildlife Interpretations

Needleandthread, Prairie Sandreed (HCPC): 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/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.

Needleandthread, Threadleaf Sedge, Fringed Sagewort Plant Community:

This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds.

Threadleaf Sedge, Fringed Sagewort, Yucca Plant Community:

This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. Production is low and plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover.

Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

Plant Community Production Carrying Capacity*

(lb./ac) (AUM/ac)

Needleandthread, Prairie Sandreed 900-1800 .4

Needleandthread, Threadleaf Sedge, Fringed Sage 700-1200 .3

Threadleaf Sedge, Fringed Sage, Yucca 600-900 .2

* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group 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% 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% 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 should be barely distinguishable if at all present. Pedestals are only slightly present in association with bunchgrasses. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1-2% 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.

Inventory data references

Inventory Data References (narrative)

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel was also used. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source Number of Records Sample Period State County

SCS-RANGE-417 1971-1994 WY

Ocular estimates 1990-1999 WY

Contributors

G. Mitchell

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.

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Date	04/01/2005
Approved by	E. Bainter
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

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5. **Number of gullies and erosion associated with gullies:** Active gullies should be restricted to areas of concentrated water flow patterns on steeper slopes
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6. **Extent of wind scoured, blowouts and/or depositional areas:** Small scoured sites may be observed
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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
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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 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):** 1400 lbs/acre

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, Fringed sagewort, Broom Snakeweed, Yucca, and Species found on Noxious Weed List

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