USDA Natural Resources Conservation Service

Ecological site R043BY458WY
Shallow Clayey (SwCy) 15-19” Northern Plains Precipitation Zone

Last updated: 4/29/2024
Accessed: 05/21/2025

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.

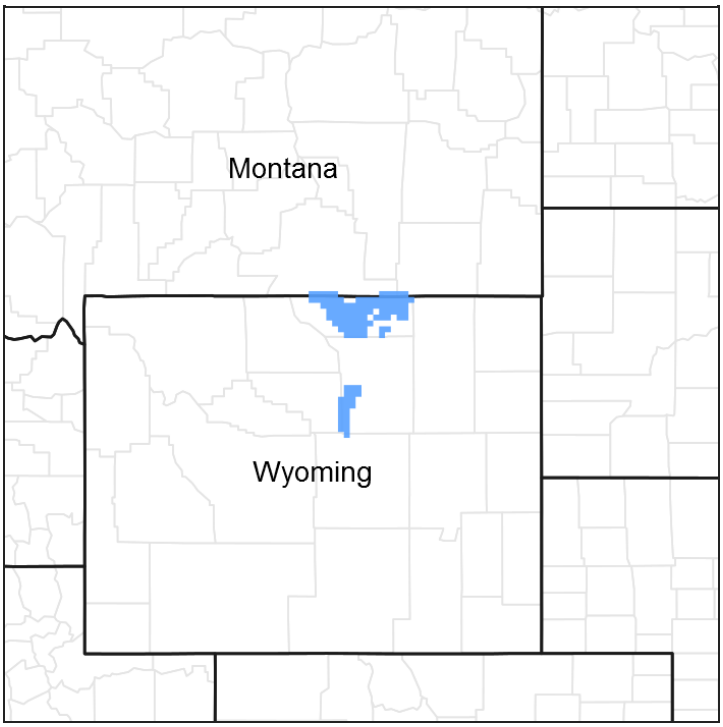


Figure 1. Mapped extent

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.

Associated sites

R043BY408WY	**Coarse Upland (CU) 15-19” Northern Plains Precipitation Zone**
R043BY462WY	**Shallow Loamy (SwLy) 15-19” Northern Plains Precipitation Zone**

R043BY476WY	**Very Shallow (VS) 15-19” Northern Plains Precipitation Zone**

Similar sites

R058BY158WY	**Shallow Clayey (SwCy) 10-14” PZ** Shallow Clayey 10-14” Northern Plains P.Z. has lower production.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on slopes and ridge tops, but may occur on all 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	20–50%
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, moderately to slowly permeable and may occur on all slopes. The bedrock is clay shale which is virtually impermeable to plant roots. The following soil textures are included in this site: silty clay,

the finer portions of sandy clay loam, clay loam or silty clay loams and all clays. Thin ineffectual layers of other soil textures are disregarded.

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Silty clay loam (3) Clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to moderately slow
Soil depth	25–51 cm
Surface fragment cover <=3"	0–25%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.56–10.67 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	5–15%
Subsurface fragment volume >3" (Depth not specified)	0%

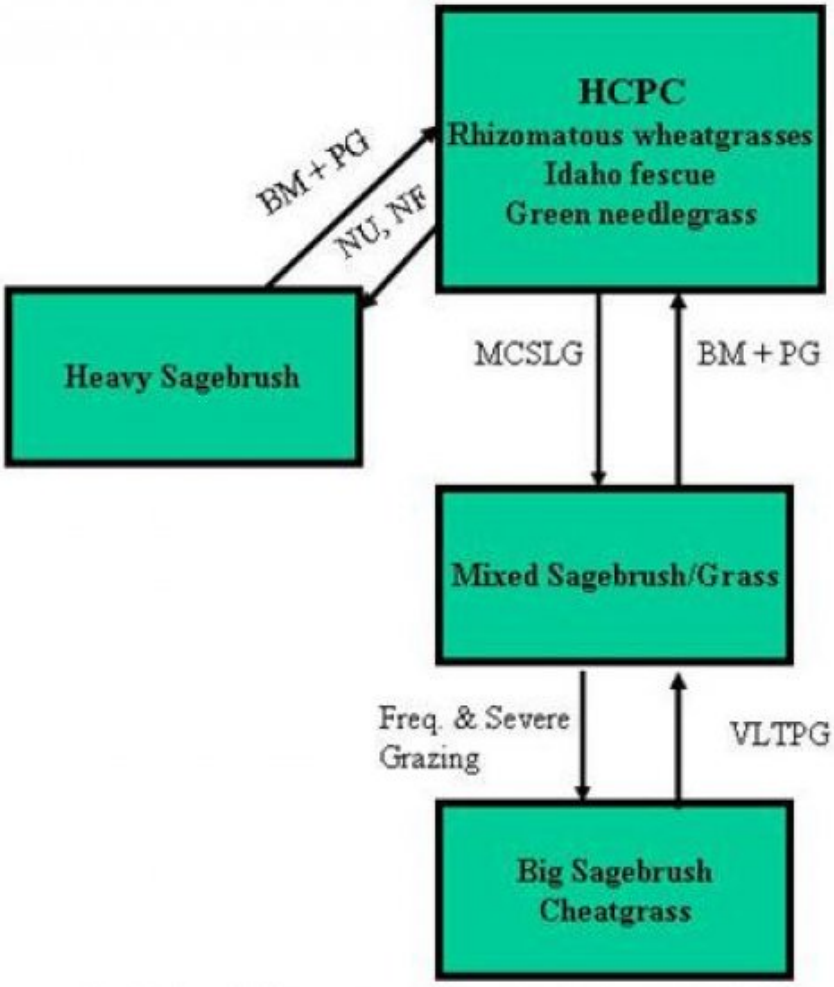
Ecological dynamics

As this site deteriorates from improper grazing management, species such as blue grama, plains pricklypear, and big sagebrush will increase. Species such as cheatgrass will invade. Cool season grasses such as green needlegrass, bluebunch wheatgrass, and rhizomatous wheatgrasses 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-tem 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 - Moderate Sodium in Soil

State 1
Rhizomatous Wheatgrasses, Idaho Fescue, Green Needlegrass Plant Community

Community 1.1
Rhizomatous Wheatgrasses, Idaho Fescue, Green Needlegrass 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 dominated by cool season midgrasses. The major grasses include rhizomatous wheatgrasses, Idaho fescue, little bluestem, green needlegrass, spike fescue and bluebunch wheatgrass. Other grasses occurring on the state include Canby and Sandberg bluegrass, needleleaf sedge, blue grama, and plains reedgrass. Big sagebrush and silver sagebrush are a conspicuous element of this state, occurring in a mosaic pattern, and make up 5 to 10% of the annual production. Big sagebrush may become dominant on some areas with absence of fire. Natural fire occurred frequently in this community and prevented sagebrush from being the dominant landscape. Wildfires are actively controlled in recent times so chemical control using herbicides has replaced the historic role of fire on this site. Recently controlled burning has regained some popularity. This state produces between 900 and 1800 pounds annually, depending on the growing conditions. 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: • Protection from grazing and fire, will convert this plant community to the Heavy Sagebrush Vegetation State. • Moderate, continuous season-long grazing will convert the plant community to the Mixed Sagebrush/Grass Vegetation State. • Long-term, heavy, continuous season-long grazing will convert the plant community to the Big sagebrush/Cheatgrass Vegetation State.

Figure 3. 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
Mixed Sagebrush/Grass Plant Community

Community 2.1
Mixed Sagebrush/Grass Plant Community

Historically, this plant community evolved under grazing by bison and a low fire frequency.

Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush control. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include needleandthread, rhizomatous wheatgrasses, Idaho fescue, bluebunch wheatgrass and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs, commonly found in this plant community, include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear and winterfat can also occur. This state produces between 800 to 1200 pounds annually, depending on the growing conditions. When compared to the Historical Climax Plant Community, sagebrush and blue grama have increased. Green needlegrass and bluebunch wheatgrass have decreased, often occurring only where protected from grazing by the sagebrush canopy. Production of cool-season grasses has also been reduced. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community which will support domestic livestock and wildlife such as mule deer and antelope. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact. However, it can be at risk depending on how far a shift has occurred in plant composition toward blue grama, sagebrush, and/or cheatgrass. The watershed is usually functioning. However, it can become at risk when canopy cover of sagebrush, blue grama sod, and/or bare ground increases. A significant reduction of big sagebrush can only be accomplished through fire or brush management. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term. Transitions or pathways leading to other plant communities are as follows: • Brush control followed by prescribed grazing, will result in a plant community very similar to the Historic Climax Plant Community. • Frequent and severe grazing, will result in a Big sagebrush/cheatgrass vegetative 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 3
Heavy Sagebrush Plant Community

Community 3.1
Heavy Sagebrush Plant Community

This plant community is the result of protection from grazing and fire. Big sagebrush dominates this plant community with canopy cover often exceeding 50%. The understory

of grass includes rhizomatous wheatgrasses, Idaho fescue, little bluestem, green needlegrass, bluebunch wheatgrass, and prairie junegrass. With complete protection from grazing and fire, the state will become dominated by big sagebrush. The cool season grasses are protected by the sagebrush canopy, but this protection makes them unavailable for grazing. Big sagebrush is long-lived and will persist for a long period. Annual production ranges from 800 to 1200 pounds. This plant community can provide valuable winter feed for both livestock (especially sheep) and wildlife (such as mule deer and antelope). The soil is well protected from erosion. The watershed is functioning. The biotic integrity is intact, except that grass production has decreased. This plant community is not resistant to change and is more vulnerable to severe disturbance than the HCPC. The introduction of grazing or fire quickly changes the plant community. Soil erosion is accelerated because of increased bare ground. Water flow patterns and pedestaling are obvious. Infiltration is reduced and runoff is increased. Transitions or pathways leading to other plant communities are as follows: • Brush control followed by deferment for 1 to 2 years and proper grazing management thereafter will return this state to near Historic Climax Plant Community. Care should be taken when planning brush control to exclude critical winter ranges.

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 4
Big Sagebrush/Cheatgrass Plant Community

Community 4.1
Big Sagebrush/Cheatgrass Plant Community

This plant community is the result of long-term, heavy, continuous season-long grazing. It is dominated by big sagebrush and cheatgrass. The total annual production ranges from 500 to 900 pounds. When compared to the historic climax plant community the main perennial grasses are the rhizomatous wheatgrasses and the dominant shrubs are big sagebrush and silver sagebrush. Much bare ground is present. This community has lost some of its value for grazing wildlife and livestock. It is susceptible to erosion and increased runoff due to the bare ground. This plant community is relatively stable with the rhizomatous wheatgrasses being somewhat resistant to overgrazing and the cheatgrass effectively competing against the establishment of perennial cool-season grasses. An increase in bare ground reduces water infiltration and increases soil erosion. The watershed is usually functioning. The biotic integrity is reduced by the lack of diversity in the plant community. Transitions or pathways leading to other plant communities are as follows: • Steep slopes restrict mechanical means of range improvement. Long-term proper grazing management may return this state to the mixed sagebrush/grass vegetation state.

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				157–392	
	western wheatgrass	PASM	*Pascopyrum smithii*	157–392	–
2				78–157	
	little bluestem	SCSC	*Schizachyrium scoparium*	78–157	–
3				78–157	
	bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	78–157	–
4				78–157	
	green needlegrass	NAVI4	*Nassella viridula*	78–157	–
5				78–157	
	spike fescue	LEKI2	*Leucopoa kingii*	78–157	–
6				78–157	
	Idaho fescue	FEID	*Festuca idahoensis*	78–157	–
7				78–235	
	Grass, perennial	2GP	*Grass, perennial*	0–78	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	0–78	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–78	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–78	–
	Pumpelly's brome	BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	0–78	–
	needleleaf sedge	CADU6	*Carex duriuscula*	0–78	–

	plains reedgrass	CAMO	*Calamagrostis montanensis*	0–78	–
	squirreltail	ELEL5	*Elymus elymoides*	0–78	–
	needle and thread	HECO26	*Hesperostipa comata*	0–78	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–78	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–78	–
Forb					
8				78–157	
	Forb, perennial	2FP	*Forb, perennial*	0–78	–
	yarrow	ACHIL	*Achillea*	0–78	–
	rosy pussytoes	ANRO2	*Antennaria rosea*	0–78	–
	field chickweed	CEAR4	*Cerastium arvense*	0–78	–
	bastard toadflax	COMAN	*Comandra*	0–78	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–78	–
	prairie clover	DALEA	*Dalea*	0–78	–
	buckwheat	ERIOG	*Eriogonum*	0–78	–
	aster	EUCEP2	*Eucephalus*	0–78	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–78	–
	desertparsley	LOMAT	*Lomatium*	0–78	–
	lupine	LUPIN	*Lupinus*	0–78	–
	bluebells	MERTE	*Mertensia*	0–78	–
	beardtongue	PENST	*Penstemon*	0–78	–
	phlox	PHLOX	*Phlox*	0–78	–
	mountain goldenbanner	THMOM3	*Thermopsis montana var. montana*	0–78	–
	American vetch	VIAM	*Vicia americana*	0–78	–
Shrub/Vine					
9				0–78	
	winterfat	KRLA2	*Krascheninnikovia lanata*	0–78	

	winterfat	KRLA2	*Krascheninnikovia lanata*	0–78	–
10				0–78	
	big sagebrush	ARTR2	*Artemisia tridentata*	0–78	–
11				0–78	
	silver sagebrush	ARCA13	*Artemisia cana*	0–78	–
12				0–78	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–78	–

Animal community

Animal Community – Wildlife Interpretations
Rhizomatous Wheatgrasses, Idaho Fescue, Green Needlegrass Plant Community (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.

Mixed Sagebrush/Grass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer’s sparrows’ nest in big sagebrush plants, and hosts of other nesting birds utilize stands in the 20-30% cover range.

Heavy Sagebrush Plant Community: This plant community can provide important winter foraging for elk, mule deer and antelope, as sagebrush can approach 15% protein and 40-60% digestibility during that time. This community provides excellent escape and thermal cover for large ungulates, as well as nesting and brood rearing habitat for sage grouse.

Big Sagebrush/Cheatgrass 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.

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)
Rhiz. WG, Idaho Fescue, Green needlegrass 900-1800 .4
Heavy Sagebrush 800-1200 .3
Mixed Sagebrush/Grass 800-1200 .35
Big Sagebrush, Cheatgrass 500-900 .20

* - 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 C and D. Infiltration ranges from very slow to moderately slow. Runoff potential for this site varies from moderate 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 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 such as bluebunch wheatgrass. 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

Approval

Kirt Walstad, 4/29/2024

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)	
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:** Due to the wide slope range associated with this site, the number and extent of rills will vary from none on sites with slopes of < 9% to common on slopes > 25%.

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2. **Presence of water flow patterns:** Due to the wide slope range associated with this site, water flow patterns will vary from barely observable on sites with slopes of < 9% from broken and irregular in appearance to continuous on slopes > 25%..

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3. **Number and height of erosional pedestals or terracettes:** Not evident on slopes < 9%. Erosional pedestals will be present with terracettes present at debris dams on slopes >9%.

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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 20 to 35%.

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5. **Number of gullies and erosion associated with gullies:** Active gullies restricted to concentrated water flow patterns.

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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):** Little to no plant litter movement occurs on slopes < 9%. Litter movement does occur on slopes > 25%.

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 65% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 or greater.

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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 and color of A-horizon.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Plant canopy, very slow to slow infiltration rates, the amount of bare ground, and steepness of slopes results in a naturally high runoff rate on slopes > 25%, even in HCPC.

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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 would be expected except for the naturally occurring rooting restriction (bedrock or decomposing shale) at 10 to 20 inches.

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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:

    Sub-dominant:

    Other:

    Additional: Mid-stature bunch grasses > mid-stature rhizomatous grasses > short stature grasses/grasslikes > shrubs > forbs

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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):** Litter cover is in contact with soil surface.

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 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:** Blue grama, plains pricklypear, Cheatgrass, big sagebrush and Species found on Noxious Weed List.

17. **Perennial plant reproductive capability:** No limitations.