

Ecological site R034AY366WY

Shallow Sandy High Plains Southeast (SwSy)

Accessed: 05/19/2024

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.

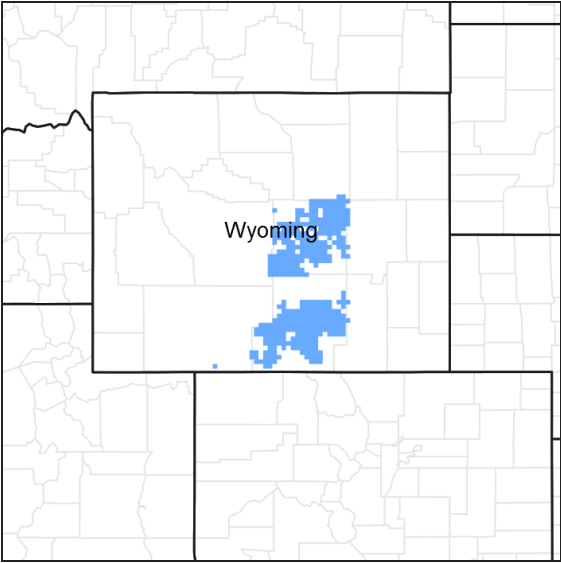


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs in an upland position on south and west facing slopes, but may be found on all slopes and positions.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	1,676–2,286 m
Slope	0–45%

Ponding depth	0 cm
Aspect	Aspect is not a significant factor

## Climatic features

Annual precipitation ranges from 10-14 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about June 15. Some green up of cool season plants usually occurs in September.

The following information is from the "Laramie" climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 57 149 June 1 – September 16

Freeze-free period (days): 94 183 May 15 – September 28

Annual Precipitation (inches): 5.8 17.34

Mean annual precipitation: 11.53 inches

Mean annual air temperature: 42.2 F (30.4 F Avg. Min. to 53.9 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 "Dixon " and "Medicine Bow".

**Table 3. Representative climatic features**

Frost-free period (average)	149 days
Freeze-free period (average)	183 days
Precipitation total (average)	356 mm

## Influencing water features

Stream type: None

## Soil features

The soils of this site are shallow (10 to 20 inches to hard or soft bedrock, or less commonly, sandy-skeletal material), well-drained soils formed in residuum or aeolian deposits. These soils have moderate to rapid permeability and may occur on all slopes.

**Table 4. Representative soil features**

Surface texture	(1) Fine sandy loam (2) Sandy loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to excessively drained
Permeability class	Moderate to rapid

Soil depth	25–51 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	3.3–6.35 cm
Calcium carbonate equivalent (0-101.6cm)	0–5%
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)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–10%

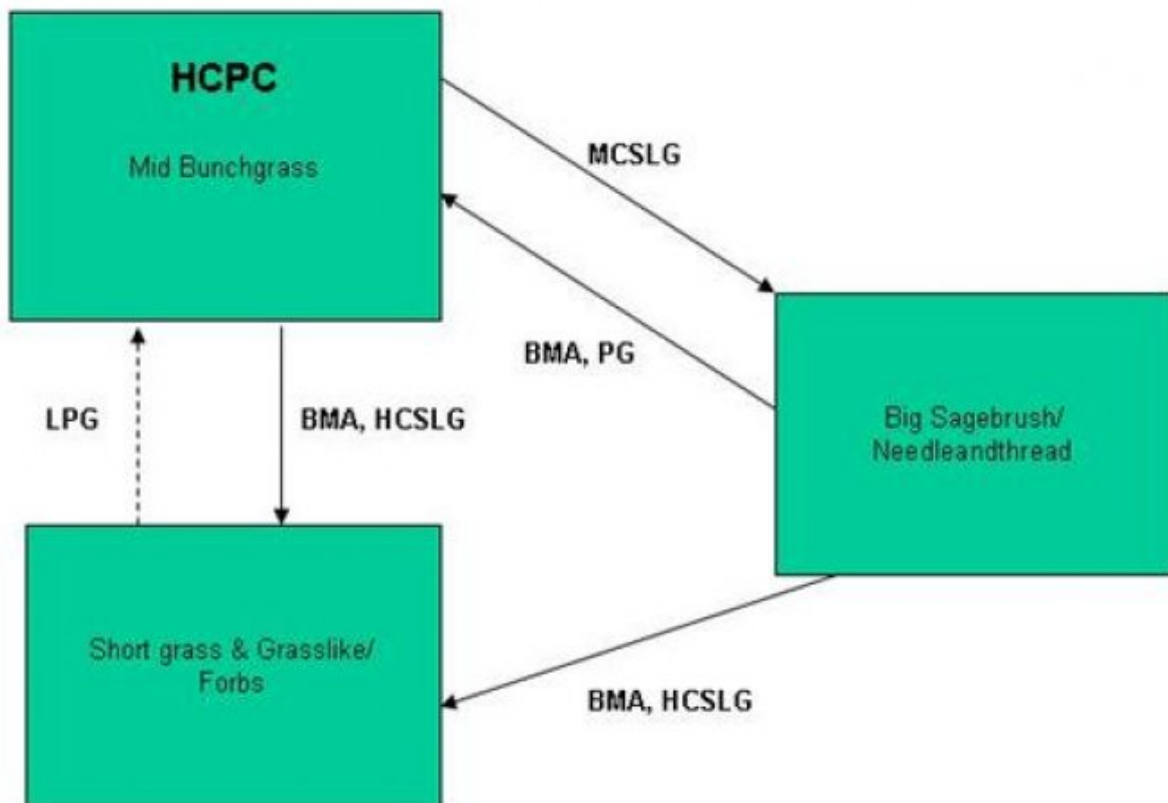
## Ecological dynamics

As this site deteriorates from improper grazing management, species such as fringed sagewort, Sandberg bluegrass, threadleaf sedge, and unpalatable forbs will increase. Bunchgrasses such as bluebunch wheatgrass, needleandthread, and Indian ricegrass 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



BMA – Brush Management (all methods)  
 BMC – Brush Management (chemical)  
 BMF – Brush Management (fire)  
 BMM – Brush Management (mechanical)  
 CSP – Chemical Seedbed Preparation  
 CSLG – Continuous Season-long Grazing  
 DR – Drainage  
 CSG – Continuous Spring Grazing  
 HB – Heavy Browse  
 HCSLG – Heavy Continuous Season-long Grazing  
 HI – Heavy Inundation  
 LPG – Long-term Prescribed Grazing  
 MT – Mechanical Treatment (chiseling, ripping, pitting)  
 MCSLG – Moderate Continuous Season Long Grazing

NF – No Fire  
 NS – Natural Succession  
 NWC – Noxious Weed Control  
 NWI – Noxious Weed Invasion  
 NU – Nonuse  
 P&C – Plow & Crop (including hay)  
 PG – Prescribed Grazing  
 RPT – Re-plant Trees  
 RS – Re-seed  
 SGD – Severe Ground Disturbance  
 SHC – Severe Hoof Compaction  
 WD – Wildlife Damage (Beaver)  
 WF – Wildfire

State 1  
Mid Bunchgrass Plant Community (HCPC)

Community 1.1  
Mid Bunchgrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 75% grasses or grass-like plants, 10% forbs, and 15% woody plants. The major grasses include needleandthread, Indian ricegrass, and bluebunch wheatgrass. Other grasses and grasslikes include thickspike wheatgrass, Sandberg and mutton bluegrass, prairie junegrass, bottlebrush squirreltail, plains reedgrass, and threadleaf sedge. Wyoming big sagebrush and green rabbitbrush are the major woody plants. A typical plant composition for this state consists of bluebunch wheatgrass 15-25%, Indian ricegrass 10-20%, needleandthread 10-30%, other grasses and grass-like plants 10-25%, perennial forbs 5-10%, and shrubs 5-15% Ground cover, by ocular estimate, varies from 15-25%. The total annual production (air-dry weight) of this state is about 900 pounds per acre, but it can range from about 700 lbs./acre in unfavorable years to about 1200 lbs./acre in above average years. The state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought resistance. 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 Continuous Season Long Grazing will convert this plant community to the Big Sagebrush/Needleandthread Plant Community. • Brush Management followed by Heavy Continuous Season-long Grazing will convert this plant community to the Short Grass & Grasslike/Forbs plant community.

Figure 4. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 2  
Big Sagebrush/Needleandthread Plant Community

Community 2.1  
Big Sagebrush/Needleandthread Plant Community

This plant community is the result of moderate continuous season long grazing. The understory of grass includes bluebunch wheatgrass, needleandthread, Indian ricegrass, and rhizomatous wheatgrass. Wyoming big sagebrush is dominant, often exceeding 20% of the annual production. Green rabbitbrush will also increase, lowering herbaceous production. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 600 lbs./acre in unfavorable years to about 1100 lbs./acre in above average years. The state is stable and protected from excessive erosion. The biotic integrity of this plant community is usually intact, however forage value will decrease and wildlife values will shift toward different species. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by Prescribed Grazing will return this state to near Historic Climax Plant Community (Mid Bunchgrass State). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Brush Management followed by Heavy Continuous Season-long Grazing will convert this plant community to the Short Grass & Grasslike/Forbs plant community.

Figure 5. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 3  
Short Grass & Grasslike/Forbs plant community Plant Community

Community 3.1

Short Grass & Grasslike/Forbs plant community Plant Community

This plant community is the result of heavy continuous season long grazing. With sagebrush removed, it is dominated by fringed sagewort, threadleaf sedge, prairie junegrass, blue grama, and unpalatable annual and perennial forbs There is a substantial amount of bare ground. The total annual production (air-dry weight) of this state is about 400 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 700 lbs./acre in above average years. The soil is not protected and erosion will increase if management is not changed. The biotic integrity may be reduced due to low vegetative production and blowing sand. The watershed is functioning at risk. Transitional pathways leading to other plant communities are as follows: • Long Term Prescribed Grazing may eventually return this state to near Historic Climax Plant Community (Mid Bunchgrass).

Figure 6. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	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 (%)
<b>Grass/Grasslike</b>					
1				151–252	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	151–252	–
2				101–202	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	101–202	–
3				50–101	
	muttongrass	POFE	<i>Poa fendleriana</i>	50–101	–
4				101–303	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	101–303	–
5				50–151	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	50–151	–
6				101–252	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–50	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–50	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–50	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–50	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–50	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–50	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–50	–
<b>Forb</b>					
7				50–101	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–50	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–50	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	0–50	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–50	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–50	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–50	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–50	–
	deathcamas	ZIGAD	<i>Zigadenus</i>	0–50	–
<b>Shrub/Vine</b>					
8				50–151	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–50	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0–50	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–50	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–50	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–50	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0–50	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–50	–

## Animal community

## Animal Community – Wildlife Interpretations

Mid Bunchgrass Plant Community (HCPC): Suitable thermal and escape cover for most wildlife is limited due to the low height and density of woody plants. However, sagebrush, which can approach 15% protein and 40-60% digestibility, provides important winter forage for mule deer and antelope. Open and bare ridges are suitable locations for sage grouse leks. Year-round habitat is provided for sage grouse and many other sagebrush obligate species such as the sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, sagebrush vole, horned lizard, and pronghorn antelope. Other birds that would frequent this plant community include horned larks and golden eagles.

Big Sagebrush/Needleandthread Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

Short Grass & Grasslike/Forbs Plant Community: These communities provide limited forage for antelope and mule deer due to low production. Generally, these are not target plant communities for wildlife habitat management.

## 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)

Mid Bunchgrass (HCPC) 700-1200 0.3

Big Sagebrush/Needleandthread 600-1100 0.26

Short Grass & Grasslike/Forbs 200-700 0.1

\* - 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 D. Infiltration is low when soils are wet due to shallow depth to bedrock and/or impervious subsurface layer. Runoff potential for this site varies from high to moderate depending on soil depth, bedrock type (impervious vs. permeable) and ground cover (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. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

## Recreational uses

This site provides hunting opportunities for upland game species.

## 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 were 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 69 1967-1988 WY Carbon

& others

## Contributors

B. Brazee

## 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	05/01/2005
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

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2. **Presence of water flow patterns:** Barely observable

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent

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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 40-60% 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
- 
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 50% 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 Bunch Grasses >> Short grasslikes = Shrubs > Mid Stature Rhizomatous Grasses = Forbs = Short grasses
- 
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 15-25% 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):** 900 lbs/ac
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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, Unpalatable forbs, Annuals, and Species found on Noxious Weed List
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17. **Perennial plant reproductive capability:** All species are capable of reproducing
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