

Ecological site R034AY358WY

Shallow Clayey High Plains Southeast (SwCy)

Accessed: 05/01/2024

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.

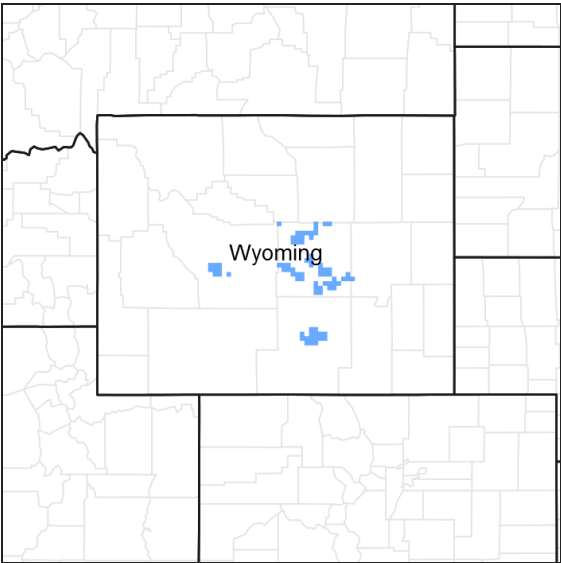


Figure 1. Mapped extent

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	0–60%

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 bedrock) well-drained soils formed in residuum or colluvium with 35-50 percent clay overlying soft shale.

Table 4. Representative soil features

Surface texture	(1) Clay loam (2) Clay (3) Sandy clay
Family particle size	(1) Clayey
Drainage class	Well drained
Permeability class	Very slow to slow
Soil depth	25–51 cm

Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	4.57–8.13 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0–8 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)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–15%

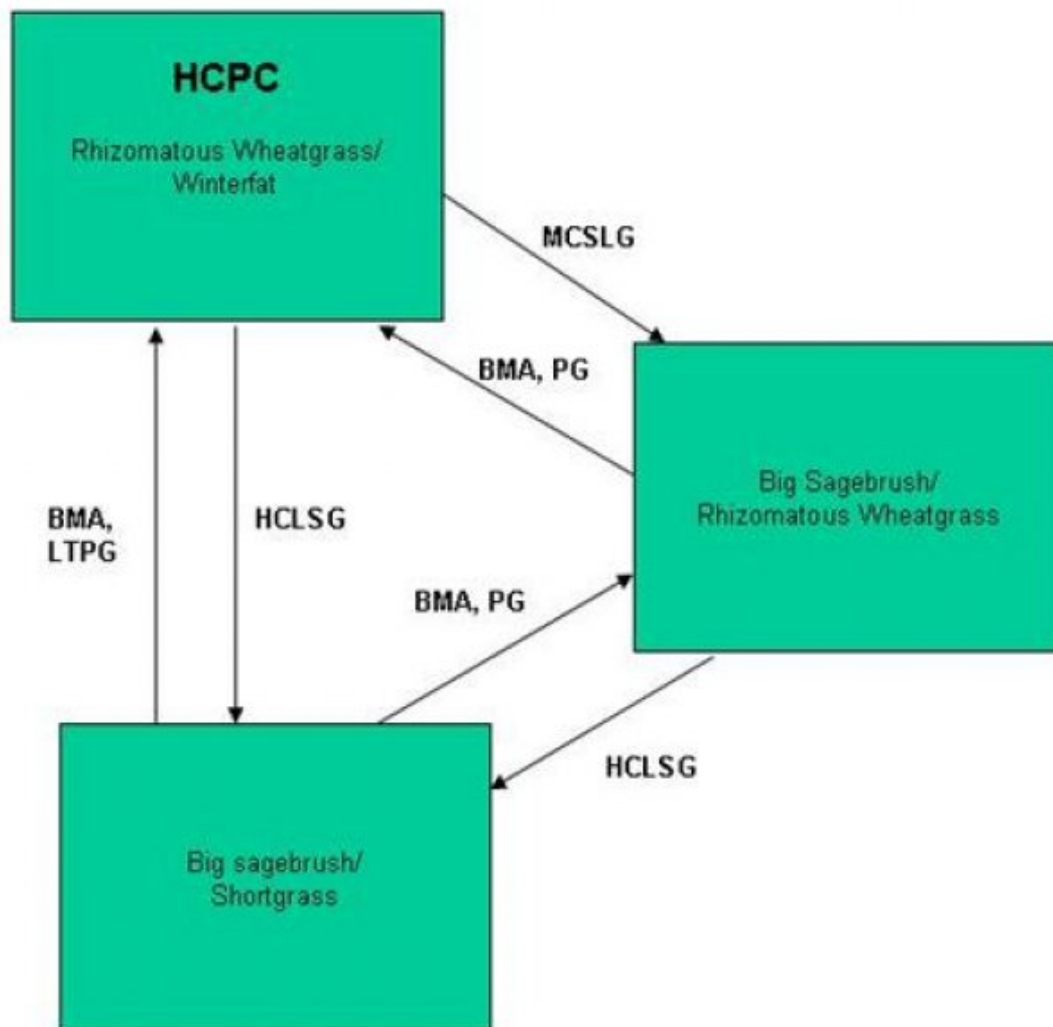
Ecological dynamics

As this site deteriorates from improper grazing management, species such as Sandberg bluegrass, and big sagebrush become dominant with low growing forbs and annuals present.

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
Rhizomatous Wheatgrass/Winterfat Plant Community (HCPC)

Community 1.1
Rhizomatous Wheatgrass/Winterfat Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is about 70% grasses or grass-like plants, 10% forbs, and 20% woody plants. The major grasses include western wheatgrass, bluebunch wheatgrass, mutton bluegrass, and bottlebrush squirreltail. Other grasses include Sandberg bluegrass, prairie junegrass, plains reedgrass, and threadleaf sedge. Winterfat, Gardner’s saltbush, and big sagebrush are the major woody plants. A typical plant composition for this state consists of western wheatgrass 35-45%, bluebunch wheatgrass 5-15%, mutton bluegrass 5-15%, bottlebrush squirreltail 5-10%, other grasses and grass-like plants 5-20%, perennial forbs 5-15%, winterfat 5-10%, and other shrubs 0-5% Ground cover, by ocular estimate, varies from 15-25%. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 1000 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/Rhizomatous Wheatgrass Plant Community. • Heavy Continuous Season-long Grazing will convert this plant community to the Big Sagebrush/Short Grass 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/Rhizomatous Wheatgrass Plant Community

Community 2.1
Big Sagebrush/Rhizomatous Wheatgrass Plant Community

This plant community is the result of moderate continuous season long grazing. The understory of grass includes bluebunch wheatgrass, muttongrass, bottlebrush squirreltail, and rhizomatous wheatgrass. Big sagebrush is dominant, often exceeding 20% of the annual production. Winterfat is reduced in the community The total annual production (air-dry weight) of this state is about 700 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 900 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 (Rhizomatous Wheatgrass/Winterfat). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Heavy Continuous Season Long Grazing will convert the site to the Big Sagebrush/Shortgrass 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
Big Sagebrush/Shortgrass Plant Community

Community 3.1
Big Sagebrush/Shortgrass Plant Community

This plant community is the result of heavy continuous season long grazing. Big sagebrush dominates the community with 50 -60% of total production. Western wheatgrass, Sandberg bluegrass, and threadleaf sedge remain. Woody aster becomes prevalent. There is a substantial amount of bare ground. The total annual production (air-dry weight) of this state is about 300 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 500 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:

- Brush Management(chemical) followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Rhizomatous Wheatgrass/Winterfat) or towards Big Sagebrush/Rhizomatous Wheatgrass Plant Community. Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges.

**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 (%)
Grass/Grasslike					
1				314–404	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	314–404	–
2				45–135	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	45–135	–
3				45–135	
	muttongrass	POFE	<i>Poa fendleriana</i>	45–135	–
4				45–90	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	45–90	–
5				45–179	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–45	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–45	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–45	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–45	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–45	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–45	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–45	–
Forb					
6				45–135	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–45	–
	desert princesplume	STPI	<i>Stanleya pinnata</i>	0–45	–
	woodyaster	XYLOR	<i>Xylorhiza</i>	0–45	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–45	–
	desert princesplume	STPI	<i>Stanleya pinnata</i>	0–45	–
	woodyaster	XYLOR	<i>Xylorhiza</i>	0–45	–
Shrub/Vine					
7				45–90	
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	45–90	–
8				0–45	
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–45	–
9				0–45	
	Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	0–45	–
10				0–45	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–45	–

Animal community

Animal Community – Wildlife Interpretations

Rhizomatous Wheatgrass/Winterfat 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/Rhizomatous Wheatgrass Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community.

Big Sagebrush/Short Grass 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)

Rhizomatous Wheatgrass/Winterfat (HCPC) 500-1000 0.26

Big Sagebrush/ Rhizomatous Wheatgrass 400-900 0.2

Big Sagebrush/Shortgrass 100-500 0.09

* - 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. Wildflowers that bloom in spring have esthetic values that appeal 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 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 will be continuous.

2. **Presence of water flow patterns:** Water flow paths will be obvious, regular and continuous with debris dams occurring only on lesser slopes.

3. **Number and height of erosional pedestals or terracettes:** Erosional pedestals present with terracettes present at debris dams.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 75 to 85%.

5. **Number of gullies and erosion associated with gullies:** Active gullies may be present on steeper slopes.

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

-
7. **Amount of litter movement (describe size and distance expected to travel):** Plant litter movement is expected.
-
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 20% or greater of soil surface. Stability class 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:** Sparse plant canopy (8% maximum), slow infiltration rates, and the high amount of bare ground contribute to a naturally high runoff rate even in HCPC.
-
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 but soil surface is typically crusted and hard to very hard when dry.
-
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 rhizomatous grasses > Mid stature bunch grasses = shrubs > forbs = short stature grasses/grasslikes
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Some plant mortality and decadence (10 to 15%) is expected on this site.
-
14. **Average percent litter cover (%) and depth (in):** Litter cover is in contact with soil surface with little evidence of biological activity.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 800 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: Annuals, unpalatable forbs, and Species found on Noxious Weed List.

17. **Perennial plant reproductive capability:** Limited ability to reproduce.
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