

Ecological site R034AY336WY **Saline Loamy High Plains Southeast (SnLy)**

Accessed: 05/12/2025

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.

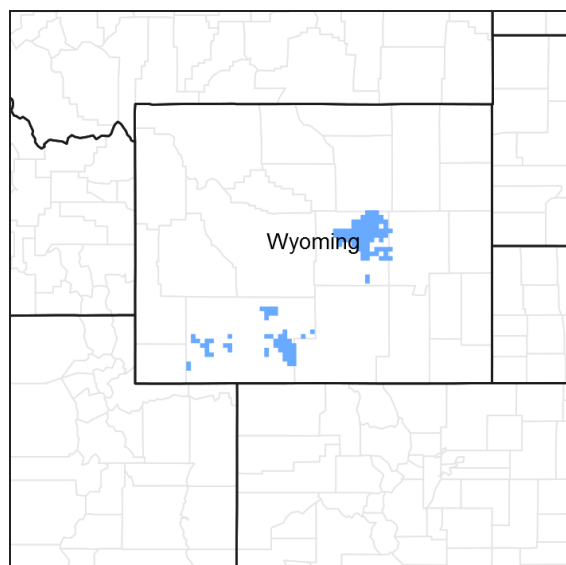


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site will usually occur in a lowland position, on flat to gently sloping land, but can occur in all positions.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,676–2,286 m
Slope	0–40%
Ponding depth	0 cm

Aspect	Aspect is not a significant factor
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Climatic features

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 moderately deep (greater than 20" to bedrock) to very deep. Permeability is moderately slow to slow due to excess sodium in the substratum. Depth to horizons with excessive amounts of sodium and strongly alkaline reactions ranges from 10 to 20 inches. These horizons restrict deep root penetration by all but alkali tolerant species. These soils are typically calcareous throughout and have salts which, although low at the surface and upper subsoil, increase with depth.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Fine sandy loam (3) Sandy clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to very slow

Soil depth	38–152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–11.43 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	5–40
Soil reaction (1:1 water) (0-101.6cm)	6.6–9.6
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

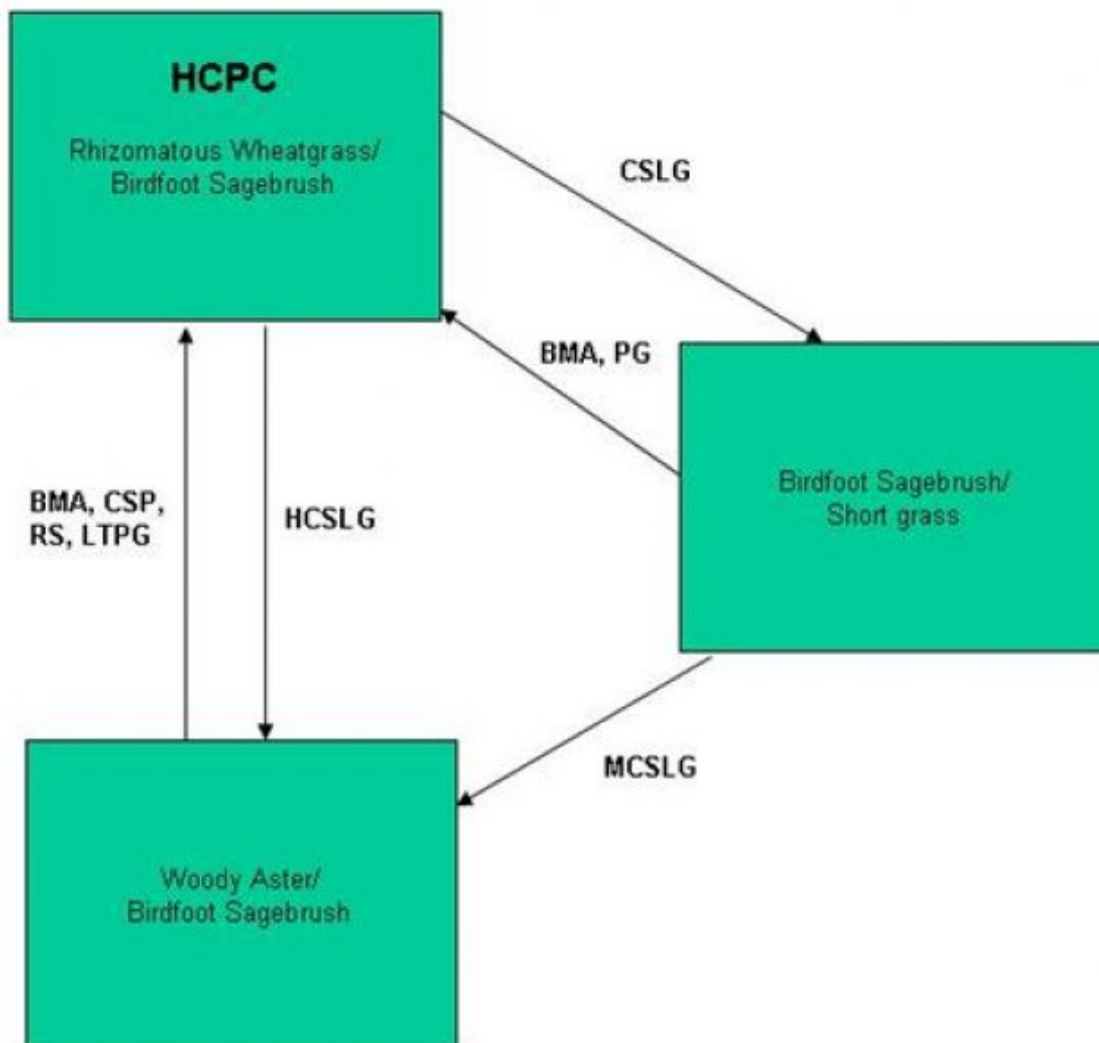
Ecological dynamics

As this site deteriorates from improper grazing management, species such as birdfoot sage and unpalatable forbs will increase. Western wheatgrass and needleandthread 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
Rhizomatous Wheatgrass/ Birdfoot Sage Plant Community (HCPC)

Community 1.1
Rhizomatous Wheatgrass/ Birdfoot Sage Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 60% grasses or grass-like plants, 10% forbs and 30% woody plants. The major grasses include western wheatgrass, needleandthread, and bluebunch wheatgrass. Other grasses include Sandberg bluegrass, prairie junegrass, bottlebrush squirreltail. Birdfoot sagebrush and Gardners saltbush are the major woody plants. A typical plant composition for this state consists of western wheatgrass 25-35%, needleandthread 5-15%, bluebunch wheatgrass 5-10%, 10-25% other grasses/grasslikes, perennial forbs 5-10%, birdfoot sagebrush 10-20%, and Gardners saltbush 10-20%. Ground cover, by ocular estimate, varies from 15-25%. The total annual production (air-dry weight) of this state is about 700 pounds per acre, but it can range from about 500 lbs./acre in unfavorable years to about 900 lbs./acre in above average years. This state is extremely stable and well adapted to the Cool Central Desertic Basins and Plateaus climate. 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: • Heavy Continuous Season-long Grazing will convert the plant community to the Woody Aster/ Birdfoot Sagebrush Plant Community. • Continuous Season-long Grazing will convert the plant community to the Rhizomatous Birdfoot 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
Birdfoot Sagebrush/Short Grass Plant Community

Community 2.1
Birdfoot Sagebrush/Short Grass Plant Community

This plant community is the result of moderate continuous season long grazing of the HCPC. Birdfoot sagebrush and short stature grasses such as prairie junegrass, Sandberg bluegrass, and bottlebrush squirreltail dominate. Birdfoot sagebrush usually comprises 30-40% of annual production. When compared to the HCPC, needleandthread and bluebunch wheatgrass have decreased, rhizomatous wheatgrasses remain and birdfoot sage has increased. The total annual production (air-dry weight) of this state is about 500 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 somewhat protected and erosion will increase if management is not changed. The biotic integrity is intact but may be reduced due to loss of diversity. The watershed is functioning and may be at risk. Transitional pathways leading to other plant communities are as follows: • Prescribed Grazing or Long-term Prescribed Grazing in combination with Brush Management will return this state to near Historic Climax Plant Community (Rhizomatous Wheatgrass/ Birdfoot Sage Plant Community). • Moderate to Heavy Continuous Season-long Grazing will convert the plant community to the Woody Aster/Birdfoot Sagebrush 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
Woody Aster/Birdfoot Sagebrush Plant Community

Community 3.1
Woody Aster/Birdfoot Sagebrush Plant Community

This plant community is a result of heavy continuous season-long grazing. Birdfoot sagebrush and woody aster provide 70-80% of the annual production. Cool season bunchgrasses decrease while rhizomatous wheatgrass prevails. The total annual production (air-dry weight) of this state is about 200 pounds per acre, but it can range from about 100 lbs./acre in unfavorable years to about 300 lbs./acre in above average years. This state is unstable and vulnerable to excessive erosion. The biotic integrity of this plant community is at risk or non-functioning. The watershed is usually at risk or non-functioning as bare ground increases. Transitional pathways leading to other plant communities are as follows: • Brush Management, Chemical Seedbed Prep, Reseeding and Long-term Prescribed Grazing may eventually return this state to near Historic Climax Plant Community (Rhizomatous Wheatgrass/ Birdfoot Sage Plant Community).

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				196–275	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	196–275	–
2				39–118	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	39–118	–
3				39–78	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	39–78	–
4				78–196	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–39	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–39	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–39	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–39	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–39	–
	squirreletail	ELEL5	<i>Elymus elymoides</i>	0–39	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–39	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–39	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–39	–
5				39–78	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–39	–
	sandwort	ARENA	<i>Arenaria</i>	0–39	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–39	–
	nailwort	PARON	<i>Paronychia</i>	0–39	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–39	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–39	–
	stemless mock goldenweed	STAC	<i>Stenotus acaulis</i>	0–39	–
	woodyaster	XYLOR	<i>Xylorhiza</i>	0–39	–
Shrub/Vine					
6				78–157	
	birdfoot sagebrush	ARPE6	<i>Artemisia pedatifida</i>	78–157	–
7				78–157	
	Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	78–157	–
8				39–78	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–39	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–39	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–39	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–39	–

Animal community

Animal Community – Wildlife Interpretations

Rhizomatous Wheatgrass/ Birdfoot Sagebrush Plant Community (HCPC): Suitable thermal and escape cover for mule deer may be limited due to the low height of woody plants. However, sagebrush may provide winter forage for mule deer, antelope and sage grouse. Open spaces are potential sage grouse lek locations.

Birdfoot Sagebrush/Short Grass Plant Community: This plant community has a low level of diversity. Due to the dominance of grasses, feed for browsing animals is limited. Areas of bare ground may provide leks for sage grouse.

Woody Aster/Birdfoot Sagebrush Plant Community: This plant community may be beneficial for the same wildlife 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.

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/ Birdfoot Sagebrush (HCPC) 500-900 0.2

Birdfoot Sagebrush/Short Grass 200-700 0.1

Woody Aster/Birdfoot Sagebrush 100-300 0.06

* - 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 ranges from slow to very slow. Runoff potential for this site varies from high to very high depending on 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 limited hunting opportunities.

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

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 40-50% occurring in small areas throughout site

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

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

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

on topography and water flow patterns

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 50% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 4 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 moderate.
-
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 Grasses > Shrubs > Short Grasses/Grasslikes > Forbs
-
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):** 700 lbs/ac
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Threadleaf sedge, Blue grama, Unpalatable forbs, Birdfoot sagebrush, Pricklypear, Broom

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