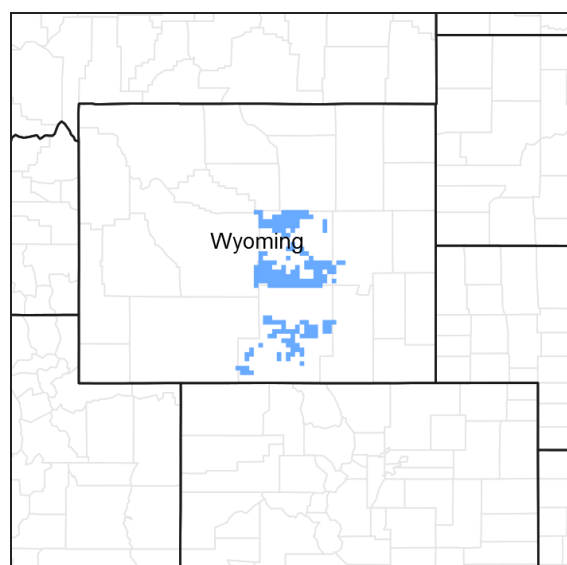


# **Ecological site R034AY376WY** **Very Shallow High Plains Southeast (VS)**

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 occurs in upland positions with a wide variety of slopes. It is prevalent on wind swept ridges. Most common slopes range from 25 to 50%.

**Table 2. Representative physiographic features**

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	5,500–7,500 ft
Slope	1–70%

Ponding depth	0 in
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)	14 in

## Influencing water features

Stream type: None

## Soil features

Soils of this site are generally less than 10 inches deep, but this site will include areas of exposed bedrock and pockets of deep soil. Coarse fragment content is typically 30-60% throughout the profile, including the surface.

**Table 4. Representative soil features**

Surface texture	(1) Sandy loam (2) Fine sandy loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to rapid
Soil depth	2–10 in

Surface fragment cover <=3"	10–40%
Surface fragment cover >3"	0–30%
Available water capacity (0-40in)	0.7–1.5 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–40%
Subsurface fragment volume >3" (Depth not specified)	10–30%

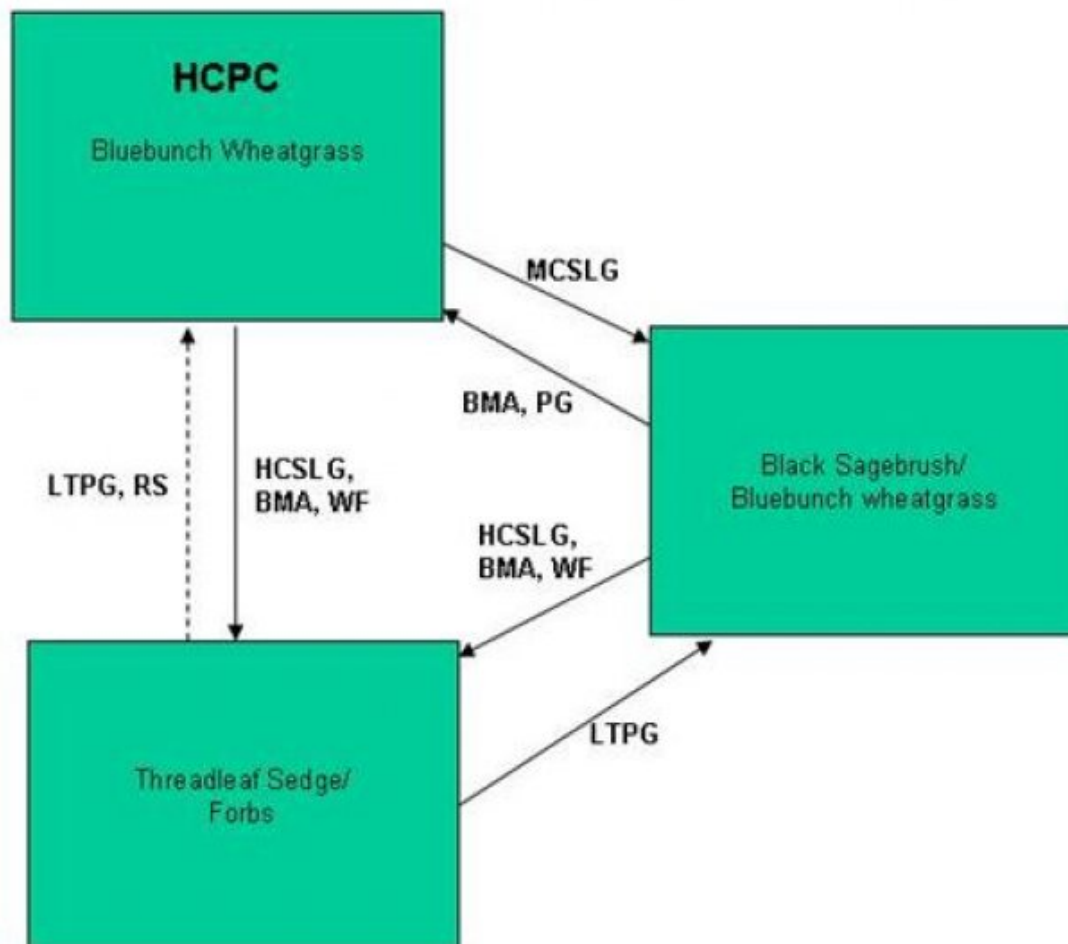
## Ecological dynamics

As this site deteriorates from improper grazing management, species such as black sagebrush, juniper, and threadleaf sedge will increase. Bluebunch wheatgrass 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

### Bluebunch Wheatgrass Plant Community (HCPC)

#### Community 1.1

##### Bluebunch Wheatgrass Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. Potential vegetation is estimated at 70% grasses or grass-like plants, 15% forbs and 15% woody plants. The major grasses include bluebunch wheatgrass, western wheatgrass and bottlebrush squirreltail. Woody species include black and big sagebrush, bitterbrush, and juniper. A typical plant composition for this state consists of bluebunch wheatgrass 40-50%, western wheatgrass 5-15%, bottlebrush squirreltail 5-15%, other grass/grasslike 10-25%, perennial forbs 5-15%, and 5-15% woody species. Ground cover, by ocular estimate, varies from 10-20%. The total annual production (air-dry weight) of this state is about 450 pounds per acre, but it can range from about 250 lbs./acre in unfavorable years to about 600 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 following Brush Management or Wild fire will convert the plant community to the Threadleaf Sedge/Forb Plant Community. • Moderate Continuous Season-long Grazing will convert the plant community to the Black Sagebrush/Bluebunch Wheatgrass Plant Community.

Figure 3. 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

### Black Sagebrush/Bluebunch Wheatgrass Plant Community

#### Community 2.1

##### Black Sagebrush/Bluebunch Wheatgrass Plant Community

This plant community is the result of moderate continuous season long grazing of the HCPC. Black sagebrush comprises 20-30% of annual production. When compared to the HCPC, bluebunch wheatgrass has decreased but remains as the dominant herbaceous species. The total annual production (air-dry weight) of this state is about 350 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 500 lbs./acre in above average years. The soil is protected but erosion will increase if management is not changed. The biotic integrity is intact but may be reduced due to low vegetative production. The watershed is functioning. Transitional pathways leading to other plant communities are as follows: • Brush Management and Prescribed Grazing or Long-term Prescribed Grazing will return this state to near Historic Climax Plant Community (Bluebunch Wheatgrass Plant Community). • Heavy Continuous Season-long Grazing following Brush Management or Wild fire will convert the plant community to the Threadleaf Sedge/Forb 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 3

### Threadleaf Sedge/ Forbs Plant Community

#### Community 3.1

##### Threadleaf Sedge/ Forbs Plant Community

This plant community is a result of heavy continuous season-long grazing. Brush management and wildfire reduce

woody species. Bluebunch wheatgrass is replaced by threadleaf sedge and short growing forbs such as sandwort, phlox, fringed sagewort, and wild buckwheat. 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 somewhat stable but vulnerable to excessive erosion. The biotic integrity of this plant community is at risk. The watershed is usually at risk or non-functioning as bare ground increases. Transitional pathways leading to other plant communities are as follows: • Reseeding, if possible on these very shallow soils, followed by Prescribed Grazing or Long-term Prescribed Grazing may eventually return this state to near Historic Climax Plant Community (Bluebunch Wheatgrass 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

## Additional community tables

**Table 5. Community 1.1 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				180–225	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	180–225	–
2				23–68	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	23–68	–
3				23–68	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	23–68	–
4				45–113	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–23	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–23	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–23	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–23	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–23	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–23	–
<b>Forb</b>					
5				23–68	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–23	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–23	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–23	–
	beardtongue	PENST	<i>Penstemon</i>	0–23	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–23	–
<b>Shrub/Vine</b>					
6				23–68	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–23	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0–23	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–23	–
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	0–23	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	0–23	–

## Animal community

### Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass Plant Community (HCPC): When blown clear, this plant community provides limited winter forage for large grazers when snow depth prevents foraging on other sites. Otherwise, it is mostly used by wildlife in transit to other habitats. When found proximal to taller sagebrush, these sites can be suitable sage grouse lek locations.

Black Sagebrush/Bluebunch Wheatgrass Plant Community: This plant community may be useful 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.

Threadleaf Sedge/Forbs Plant Community: This plant community exhibits a low level of plant species diversity suitable for wildlife. In most cases, it is not a desirable plant community to select as a wildlife habitat management objective.

### 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)

Bluebunch Wheatgrass (HCPC) 250-600 0.15

Black Sagebrush/Bluebunch Wheatgrass 200-500 0.1

Threadleaf Sedge/Forbs 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

- 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 slope < 9% to common on slopes > 25%

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

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- Number and height of erosional pedestals or terracettes:** Not evident on slopes < 9% present on slopes > 9%

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- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 40-50%



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5. **Number of gullies and erosion associated with gullies:** Active restricted to concentrated water flow patterns 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):** Little to no plant litter movement on slopes < 9%. Litter movement does occur on slopes > 9%
- 
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 varies with soil texture from slow 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 >> Mid stature Rhizomatous Grasses > Shrubs/Trees = 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 is expected
- 
14. **Average percent litter cover (%) and depth ( in):** Average litter cover is 15-25% with depths of 0.10 to 0.25 inches

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 450 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, Junipers, Black sagebrush, Unpalatable forbs, Annuals, and Species found on Noxious Weed List.

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17. **Perennial plant reproductive capability:** May be limited due to effective moisture and seed to soil contact

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