

# Ecological site R034AY312WY Gravelly High Plains Southeast (Gr)

Accessed: 05/18/2024

## 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.

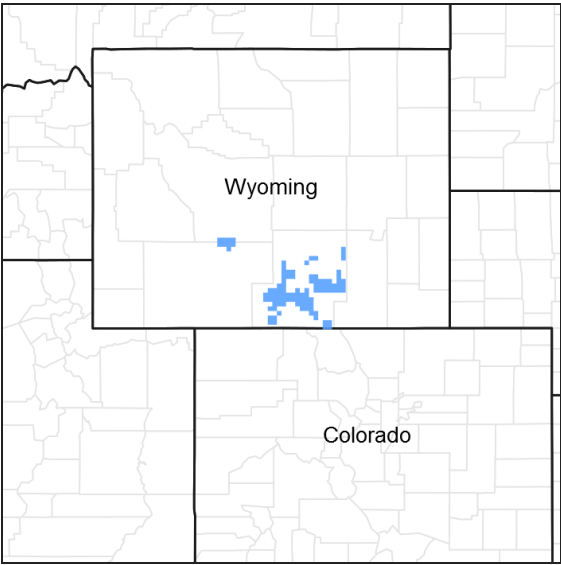


Figure 1. Mapped extent

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 occurs along terrace breaks. It is found on all exposures, on slopes mostly from 5 to 30%.

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	1–70%

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 moderately deep to deep, well-drained soils formed in alluvium. These soils are well to excessively drained sands, loamy sands, sandy loams and fine sandy loam. This site usually occurs on steep slopes, but may be on any slope. They commonly have coarse fragments up to 10 inches in diameter in the surface layer and have 35 to 60 percent coarse fragments between depths of 10 to 20 inches.

**Table 4. Representative soil features**

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

Permeability class	Moderately slow to moderately rapid
Soil depth	51–102 cm
Surface fragment cover <=3"	15–40%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	5.08–11.43 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
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)	30–50%
Subsurface fragment volume >3" (Depth not specified)	10–20%

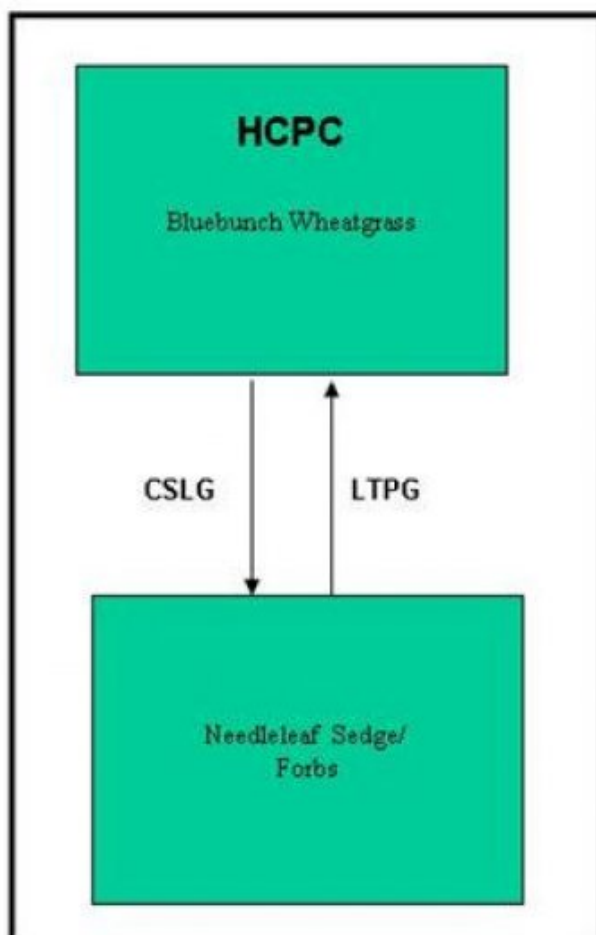
## Ecological dynamics

As this site deteriorates, species such as green rabbitbrush will increase. Cool season bunchgrasses such as bluebunch wheatgrass, Indian ricegrass, and needleandthread will decrease in frequency and production. Cheatgrass often invades. This site has relatively low productivity potential, and is not well suited to grazing improvement practices unless treated as part of a larger unit containing more productive area

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 about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. The major grasses include bluebunch wheatgrass, Indian ricegrass, and needleandthread. Other grasses and grass-like plants include rhizomatous wheatgrass, Sandberg bluegrass, needleleaf sedge, and prairie junegrass. Common woody plants include skunkbush sumac and green rabbitbrush. A typical plant composition for this state consists of bluebunch wheatgrass 40-50%, needleandthread 5-10%, Indian ricegrass 5-10%, other grasses and grass-like plants 10-20%, perennial forbs 5-10%, green rabbitbrush 1-5%, and skunkbush sumac 1-5%. 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 300 lbs./acre in unfavorable years to about 650 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: • Continuous Season-Long Grazing will convert this plant community to the Needleleaf 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 2  
Needleleaf Sedge/Forb Plant Community

Community 2.1  
Needleleaf Sedge/Forb Plant Community

This plant community is a result of continuous season long grazing. Needleleaf sedge and low growing forbs such as goldenweed, sandwort, and hoods phlox dominate the site. Cheatgrass may invade this community with continued disturbance. Transitional pathways leading to other plant communities are as follows: It is not often practicable or economically feasible to convert this plant community at the present time. Long Term Prescribed Grazing may return this state to near Historic Climax Plant Community (Bluebunch Wheatgrass Plant Community). The total annual production (air-dry weight) of this state is about 150 pounds per acre, but it can range from about 50 lbs./acre in unfavorable years to about 350 lbs./acre in above average years. The state is unstable and vulnerable to excessive erosion, however rock fragment typically prevents serious erosion from occurring. The biotic integrity of this plant community is at risk due to loss of mid bunchgrasses and opportunity for seedling establishment. The watershed is usually at risk or nonfunctioning due to an increase in bare ground. Transitional pathways leading to other plant communities are as follows: It is not often practicable or economically feasible to convert this plant community at the present time.

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 (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				202–252	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	202–252	–
2				26–76	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	26–76	–
3				26–76	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	26–76	–
4				50–127	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–26	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–26	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–26	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–26	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–26	–
<b>Forb</b>					
5				26–76	
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–26	–
	sandwort	ARENA	<i>Arenaria</i>	0–26	–
	winterfat	KRASC	<i>Krascheninnikovia</i>	0–26	–
	nailwort	PARON	<i>Paronychia</i>	0–26	–
	beardtongue	PENST	<i>Penstemon</i>	0–26	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–26	–
	violet	VIOLA	<i>Viola</i>	0–26	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	–	–
<b>Shrub/Vine</b>					
6				6–50	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	6–50	–
7				6–50	
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	6–50	–
8				0–26	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–26	–

## Animal community

### Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass Plant Community (HCPC): This plant community does not contribute much forage to wildlife nor is it typically inhabited by burrowing animals due to the high volume of coarse fragments in the profile. It is mostly used by wildlife in transit to other habitats. When found proximal to taller sagebrush, these sites are suitable locations for sage grouse leks. When occurring near perennial water, it may be used by killdeer for nesting.

Needleleaf Sedge/Forb Plant Community: This plant community exhibits a low level of plant species diversity. 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) 300-650 .14

Needleleaf Sedge/Forb 50-350 .04

\* - 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 highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, slope 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 may be present, but should be small. Water flow patterns should be barely distinguishable. 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. Cryptogammic 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.

## 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

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## 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:** 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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- 2. 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% 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% present 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 10-15%. 20-50% of soil surface is coarse fragments

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

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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 on slopes < 9%. Litter movement does occur on slopes > 9%

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- 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.

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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:** 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 moderately rapid to rapid.
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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 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 > Forbs > Shrubs > mid stature rhizomatous & short grasses

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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 10-15% 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
- 

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:** Sedges, Woody species, 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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