

Ecological site R034AY431CO Shallow Loamy 10-14 PZ

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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.

MLRA notes

Major Land Resource Area (MLRA): 034A—Cool Central Desertic Basins and Plateaus

Major Land Resource Area (MLRA): 34A-Cool Central Desertic Basins and Plateaus

For further information regarding MLRAs, refer to:

<http://soils.usda.gov/survey/geography/mlra/index.html>

LRU notes

Land Resource Unit (LRU) 34A-10:

- Moisture Regime: aridic ustic
- Temperature Regime: frigid
- Dominant Cover: rangeland
- Representative Value (RV) Effective Precipitation: 10-14 inches
- RV Frost-Free Days: 75-95 days

Classification relationships

Relationship to Other Established Classification Systems

Ecoregions (EPA):

Level I: 10 North American Deserts

Level II: 10.1 Cold Deserts

Level III: 10.1.4 Wyoming Basin

Ecological site concept

- This site does not receive any additional water.
- These soils:
 - o are not saline or saline-sodic
 - o are shallow
 - o are skeletal within 20" of the soil surface; with channers on the soil surface and have flagstones starting at a soil depth of 13 inches (33 cm), greater than 35 percent by volume.
 - o are not strongly or violently effervescent in the surface mineral layer (within top 10")
 - o have surface textures that usually range from sandy loam to sandy clay loam in surface mineral layer (4")
- have slopes less than 30 percent
- does not have a clay content that is greater than 35% in mineral soil surface layer (1-2")

Associated sites

R034AY430CO	Shale
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Similar sites

R034AY420CO	Cold Desert Breaks
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata ssp. wyomingensis</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> (2) <i>Elymus elymoides</i>

Physiographic features

This site occurs on gently sloping to strongly sloping mesas. Slopes range from 3 to 12 percent. The site occurs on all exposures. Elevation range for the site is 6500 to 8000 feet (1980 to 2440 meters).

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plateau (3) Fan
Runoff class	Medium to very high
Elevation	6,500–8,000 ft
Slope	3–12%
Aspect	Aspect is not a significant factor

Climatic features

The climate is arid to semi-arid. Winters are cool and summers are warm. The average annual precipitation ranges from 10 to 14 inches (25.4 to 35.5 cm). The peak period of precipitation occurs during the winter and the rest comes mostly as spring rain.

Plants begin growth about March 15 - April 1. The optimum growth period is April 1 through the end of May for most plants. Average annual air temperature is 42 to 47 degrees Fahrenheit (5.6 to 8.3 degrees C). Frost-free period ranges from 75 to 95 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-95 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	10-14 in
Frost-free period (average)	95 days
Freeze-free period (average)	
Precipitation total (average)	14 in

Influencing water features

None

Wetland description

None

Soil features

Soils are shallow and well drained. It formed in residuum derived dominantly from sandstone and limestone. Typically the upper 4 inches (10.2 cm) of the surface layer is dark brown channery loam. The lower 13 inches (33 cm) is brown to dark brown very flaggy loam. Limestone is at a depth of 17 inches (43.2 cm). Permeability is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches (25.4 to 50.8 cm). Runoff is rapid and the hazard of water erosion is high.

Major soils associated with this site are:

Castner Channery loam (139) 3 to 12 percent slope

Table 4. Representative soil features

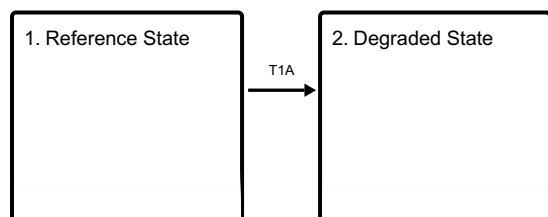
Parent material	(1) Residuum–limestone and sandstone (2) Colluvium
Surface texture	(1) Channery loam
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	10–20 in
Soil depth	10–20 in
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0–5%
Available water capacity (0-20in)	1.2–6.5 in
Soil reaction (1:1 water) (0-20in)	7.4–8.4
Subsurface fragment volume <=3" (0-20in)	5–40%
Subsurface fragment volume >3" (0-20in)	0–15%

Ecological dynamics

The plant community consists of about 45 percent grass, 10 percent forbs, and 45 percent shrubs. The dominant plants on this site are wheatgrasses, bottlebrush squirreltail, and Wyoming big sagebrush.

State and transition model

Ecosystem states



State 1 submodel, plant communities

1.1. Bluebunch wheatgrass-bottlebrush squirreltail/Wyoming big sagebrush

State 1
Reference State

Vegetation density is approximately 5 to 10 percent. Vegetation density is equivocal to the basal area. This is the area of ground surface covered by the stem or stems. Usually, this is measured at 1 inch (2.54 cm) above the surface in contrast to the full spread of perennial foliage.

Community 1.1
Bluebunch wheatgrass-bottlebrush squirreltail/Wyoming big sagebrush

If ecological retrogression is cattle-induced, desirable grasses will decrease. However, if retrogression is caused by sheep, desirable grasses, forbs, and shrubs may be reduced. Deterioration of the site by sheep will decrease Wyoming big sagebrush, winterfat, shadscale, bud sagebrush, Nuttall's saltbush, and hollyleaf clover. Plants likely to invade this site and become part of the plant community when the range is in a degenerated condition are mustard, alfileria, borage, and cheatgrass. Annual Production: If range is in excellent condition, the approximate total annual production (air-dry) range is: Favorable years 800 pounds per acre (900 kg/ha) Normal years 600 pounds per acre (675 kg/ha) Unfavorable years 350 pounds per acre (400 kg/ha) Of this production, about 35 percent will likely be unpalatable or out of reach of grazing animals.

State 2
Degraded State

This State is result of soil-disturbing activities such as hoof-action, anthropogenic activity, and rodent activity. It can also occur after brush management followed by improper grazing techniques that usually include high-intensity grazing without appropriate recovery periods.

Transition T1A
State 1 to 2

The driver for transition T1A from State 1 (Reference State) to State 2 (Degraded) is low to high intensity, long duration, and high frequency herbivory events.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Grasses			180–405	
	thickspike wheatgrass	ELLA3	<i>Elymus lanceolatus</i>	36–82	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	36–82	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	18–61	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	9–41	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	9–41	–
	bluegrass	POA	<i>Poa</i>	9–41	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	9–41	–
Forb					
2	Forbs			40–90	
	tapertip onion	ALAC4	<i>Allium acuminatum</i>	4–14	–
	fireweed	CHAN9	<i>Chamerion angustifolium</i>	4–14	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	4–14	–
	foothill bladderpod	LELU	<i>Lesquerella ludoviciana</i>	4–14	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	4–14	–
	stemless four-nerve daisy	TEAC	<i>Tetraneuris acaulis</i>	4–14	–
	hollyleaf clover	TRGY	<i>Trifolium gymnocarpon</i>	4–14	–
Shrub/Vine					
3	Shrub			180–405	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	36–82	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	9–41	–
	Gardner's saltbush	ATGA	<i>Atriplex gardneri</i>	9–41	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	9–41	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	9–41	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	9–41	–
	shortspine horsebrush	TESP2	<i>Tetradymia spinosa</i>	9–41	–
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0–20	–

Animal community

Grazing:

This site is used almost exclusively as winter range for sheep. Much of the feed consists of shrubs since many years other forage is covered by snow. When an area is left ungrazed for a number of years, brush species increase in vigor and can become dominant.

Wildlife:

This site is particularly important for antelope and sage grouse. It also serves as mule deer habitat, and where in proximity to mountain ridges, occasionally elk critical winter range. Other common wildlife species to the site include; desert and Nuttall's cottontail, white-tailed jackrabbit, white-tailed prairie dog, sage thrasher, Western bluebird, Western meadowlark, Brewer's sparrow, mourning dove, red-tailed hawk, and golden eagle.

Major Plants Poisonous to Livestock:

Common Name - spiny horsebrush and gray horsebrush

Scientific Name - *Tetradymia spinosa* and *Tetradymia canescens*

Season Dangerous - early spring

Animals Affected - sheep

Effects and Symptoms - Symptoms may vary but can include depression, weakness, and sometimes death within a few hours. In many cases acute illness is followed by sensitiveness and irritation about the head, followed by swelling of the head, neck, ears, eyelids, and nose. This is especially common in sheep that have been exposed to sunlight. Consumption of 2.2 lbs (1 kg) a day for two days in early spring is fatal to sheep. The poison is cumulative (poisoning effect increases in severity by successive additions of the poisonous plant. Symptoms appear weeks or months after poisonous plants are first eaten).

Guide to Initial Stocking Rates for Sheep:

Stocking rates are based on average growing season and 1200 pounds (540 kg) of forage (air-dry) per animal unit month. (This figure takes into account the vegetation that disappears through trampling, small herbivores, etc., which amounts to approximately 8 pounds per day (3.6 kg/day) under normal conditions).

Condition Class/ Percent Climax Vegetation:

Excellent/ 76-100%

Good/ 51-75%

Fair/ 26-50%

Poor/ 0-25%

Hydrological functions

Watershed:

Soils of this site are grouped into "D" hydrologic group, as outlined in the "Soils of Colorado Loss Factors and Erodibility Hydrologic Groupings of 1979" handbook. Field investigations are needed to determine hydrological cover conditions and hydrologic curve numbers. The hydrologic curve number for group D soils is about 85, when hydrologic conditions are poor, as shown in "Peak Flows in Colorado" handbook.

Refer to SCS National Engineering Handbook, Section 4, to determine runoff quantities from the curves.

Recreational uses

This site has native forbs and shrubs that bloom from early spring to early summer, which are aesthetically pleasing. Hunting for upland game birds, rabbits, coyotes, and antelope provide recreation.

Other information

Threatened and Endangered Plants and Animals:

There is a remote possibility black footed ferret could exist in association with prairie dog towns on this site.

Inventory data references

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.

Other references

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Contributors

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Approval

Kirt Walstad, 9/07/2023

Acknowledgments

Field Offices this Site is Located: Craig

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	05/11/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

-
2. **Presence of water flow patterns:**
-
3. **Number and height of erosional pedestals or terracettes:**
-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**
-
5. **Number of gullies and erosion associated with gullies:**
-
6. **Extent of wind scoured, blowouts and/or depositional areas:**
-
7. **Amount of litter movement (describe size and distance expected to travel):**
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
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:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

decadence):

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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:**

17. **Perennial plant reproductive capability:**
