

Ecological site R034AY424CO Loamy 7-10 PZ

Last updated: 2/19/2025
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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: 7-10 inches
- RV Frost-Free Days: 75-95 days

Classification relationships

Relationship to Other Established Classification Systems

National Vegetation Classification System (NVC):

3 Semi-Desert

3.B.1 Cool Semi-Desert Scrub & Grassland

D040 Western North American Cool Semi-Desert Scrub & Grassland

M169 Great Basin & Intermountain Tall Sagebrush Shrubland & Steppe Group

A3184 Wyoming big sagebrush Dry Steppe and Shrubland Alliance

CEGL001043 *Artemisia tridentata* ssp. *wyomingensis*/Elymus elymoides Shrubland Association

Ecoregions (EPA):

Level I: 10 North American Deserts

Level II: 10.1 Cold Deserts

Level III: 10.1.4 Wyoming Basin

Ecological site concept

- Site does not receive any additional water.
- Soils are:
 - o may be slightly saline or saline-sodic.
 - o moderately deep to deep

- o not skeletal within 20" of soil surface, minimal rock fragments at the soil surface
- o surface textures usually range from sandy loam to loam in surface mineral 4".
- Slope is < 25%.
- Clay content is < 35% and >18% in mineral soil surface 1-2".

Associated sites

R034AY423CO	Limy Cold Desert higher amount of CaCO ₃ throughout the soil profile
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Similar sites

DX034A01X122	Loamy Green River Basin (Ly GRB) similar precipitation, difference in timing of precipitation. Occurs in adjoining LRU in Wyoming.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Herbaceous	(1) <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on nearly level to strongly sloping uplands, mesas, benches, and side slopes. Slopes range from 1 to 25 percent. The site occurs on all exposures. Elevation range for the site is 6000 to 7500 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plateau (3) Hillslope
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	6,000–7,500 ft
Slope	1–25%
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 7 to 10 inches. The peak period of precipitation occurs during the winter and the rest comes mostly as spring rain.

Plants begin growth about March 15 through April 1. The optimum growth period is April 1 through the end of May for most plants. Average air temperature is 42 to 47 degrees Fahrenheit. 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)	7-10 in

Frost-free period (average)	95 days
Freeze-free period (average)	
Precipitation total (average)	10 in

Influencing water features

None

Wetland description

None

Soil features

The soils in this site are moderately deep to deep and well drained which formed in residuum. Some soils have a thin loess cap. Surface layer is very pale brown to brown loam to sandy loam about 2 to 4 inches thick. The upper 6 to 11 inches of the underlying material is light yellowish brown loam to sandy clay loam or clay loam. The subsoil is yellowish brown, grayish brown, pale brown, pinkish gray or white fine sand, fine sandy loam, sandy clay loam, loam, channery loam, cobbly loam, silty clay loam, or silty clay. Permeability of the soils is moderate. Available water capacity is low to moderate. Effective rooting depth is 20 to 60 inches. Runoff is slow to rapid and the hazard of water erosion is slight to high.

Major soils associated with this site are:

Diaflats-Fondillas complex, 2 to 15 percent slope

Fonce sandy loam, 1 to 8 percent slope

Langspring sandy loam, 3 to 12 percent slope

Rogrube, 1 to 7 percent slope

Lilsnake-Sandwash complex, 3 to 20 percent slope

Tresano sandy loam, 3 to 12 percent slope

Vermillion-Langspring complex, 3 to 25 percent slope

Table 4. Representative soil features

Parent material	(1) Residuum—sandstone and siltstone (2) Loess
Surface texture	(1) Loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	20–60 in
Surface fragment cover ≤3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0-40in)	3–10 in
Calcium carbonate equivalent (0-40in)	15–40%
Soil reaction (1:1 water) (0-40in)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–25%

Subsurface fragment volume >3" (Depth not specified)	0–15%
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Ecological dynamics

Thickspike wheatgrass and streambank wheatgrass are the dominant plants. Other plants which make up a substantial part of the production are needle and thread, bottlebrush squirreltail, Indian ricegrass, Wyoming big sagebrush, and shadscale.

If ecological retrogression is cattle-induced, desirable grasses will decrease. However if retrogression is caused by sheep, desirable species such as Wyoming big sagebrush, shadscale, Nuttall saltbush, bud sage, winterfat, and most forbs will decrease.

Plant species likely to invade this site and become part of the plant community when the range is in a degenerated condition are cheatgrass, halogeton, mustard, borage, and pepper weed.

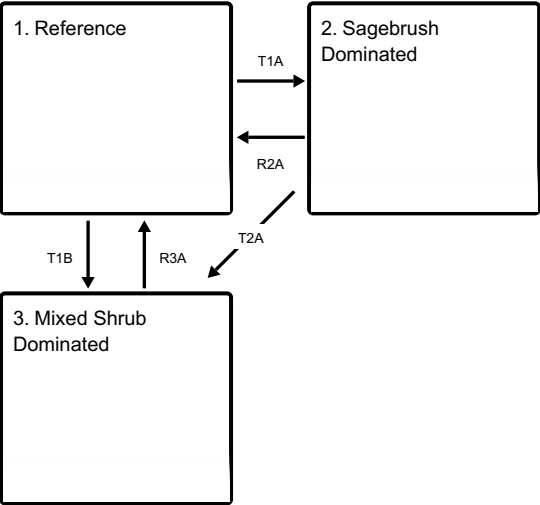
If the range is in excellent condition, the approximate total annual production (air-dry) ranges are:

- Favorable years - 725 pounds per acre
- Normal years - 575 pounds per acre
- Unfavorable years - 300 pounds per acre

Of this production, about 20 percent will likely be unpalatable or out of reach of grazing animals.

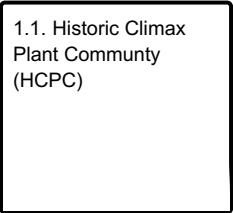
State and transition model

Ecosystem states

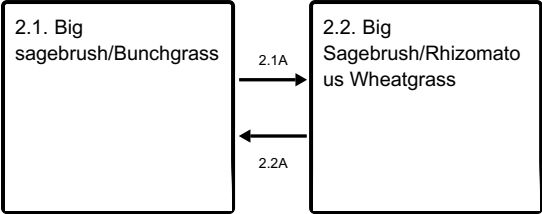


- T1A** - No fire, Non-use or Heavy continuous season-long grazing
- T1B** - Heavy continuous season-long grazing, Wildfire
- R2A** - Brush management, Prescribed Grazing
- T2A** - Brush management, Heavy continuous season-long grazing, Wildfire
- R3A** - Brush management (chemical), Prescribed grazing

State 1 submodel, plant communities



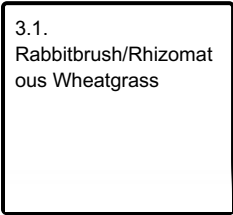
State 2 submodel, plant communities



2.1A - Heavy continuous season-long grazing, No fire

2.2A - Brush management, Prescribed grazing

State 3 submodel, plant communities



State 1
Reference

Community 1.1
Historic Climax Plant Community (HCPC)

The plant community consists of about 35 to 65 percent grasses, 5 to 15 percent forbs, and 30 to 50 percent shrubs. Vegetation density is approximately 15 to 20 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	105	290	335
Shrub/Vine	170	230	300
Forb	25	55	90
Total	300	575	725

State 2
Sagebrush Dominated

Community 2.1
Big sagebrush/Bunchgrass

Community 2.2
Big Sagebrush/Rhizomatous Wheatgrass

Pathway 2.1A
Community 2.1 to 2.2

Heavy continuous season-long grazing, No fire

Pathway 2.2A
Community 2.2 to 2.1

Brush management, Prescribed grazing

State 3
Mixed Shrub Dominated

Community 3.1
Rabbitbrush/Rhizomatous Wheatgrass

Transition T1A
State 1 to 2

No fire, Non-use or Heavy continuous season-long grazing

Transition T1B
State 1 to 3

Heavy continuous season-long grazing, Wildfire

Restoration pathway R2A
State 2 to 1

Brush management, Prescribed Grazing

Transition T2A
State 2 to 3

Brush management, Heavy continuous season-long grazing, Wildfire

Restoration pathway R3A
State 3 to 1

Brush management (chemical), Prescribed grazing

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				200–375	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	85–175	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–115	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	30–90	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	60–90	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–60	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–60	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	0–60	–
Forb					
2				30–85	
	tapertip onion	ALAC4	<i>Allium acuminatum</i>	5–30	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	5–30	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	5–30	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	5–30	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	5–30	–
	hollyleaf clover	TRGY	<i>Trifolium gymnocarpon</i>	5–30	–
	foothill deathcamas	ZIPA2	<i>Zigadenus paniculatus</i>	5–30	–
Shrub/Vine					
3				175–300	
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	85–115	–
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	60–85	–
	Nuttall's saltbush	ATNU2	<i>Atriplex nuttallii</i>	15–45	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	15–45	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	15–45	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	15–45	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	15–45	–
	bud sagebrush	PICRO	<i>Picrothamnus</i>	15–45	–

Animal community

WILDLIFE INTERPRETATIONS:

This site is particularly important for antelope and sage grouse. It also serves as mule deer habitat and 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 doves, red-tailed hawk, Golden eagle and midget-faded rattlesnake.

GRAZING INTERPRETATIONS:

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

Stocking rate given below are based on continuous use for the entire growing season, and are intended only as an initial guide. Forage needs are calculated on the basis of 1200 pounds of air-dry forage per animal unit month (AUM). This figure takes into account the vegetation that disappears through trampling, small herbivores, etc., which

amounts to approximately 8 pounds per day under normal conditions.

Condition Class - Percent Climax - (Ac/AUM) (AUM/Ac)

Excellent - 76-100% - (7.0) (.14)

Good - 51-75% - (10.0) (.10)

Fair - 26-50% - (18.0) (.06)

Poor - 0-25%

Adjustment to the initial stocking rates should be made as needed to obtain proper use. With specialized grazing systems, inaccessibility, dormant season use, presence of introduced species, etc., stocking rate adjustments will be required.

Halogeton can be poisonous to sheep and cattle in the spring. The poison is acute with symptoms occurring in 2 to 6 hours after an animal eats a fatal amount and death occurs in 9 to 11 hours. Early signs are dullness, loss of appetite, lowering of the head, and reluctance to follow the flock. Advanced signs are drooling with white or reddish froth about the mouth, progressive weakening, animals unable to stand, rapid and shallow breathing, and coma followed by a violent struggle for air.

Foothill deathcamas is poisonous to cattle, sheep, and horses. The seasons of concern are spring and early summer when fresh leaves, stems, and flowers are eaten. Symptoms usually observed consist of salivation, nausea, followed by vomiting, a lowered temperature, weakness shown by staggering or complete prostration, difficult breathing, sometimes coma followed by death.

Hydrological functions

Soils of this site are grouped into "B" hydrologic group, as outlined in the "soils of Colorado Loss Factors and Erodibility Hydrologic Groupings 1979," handbook. Field investigations are needed to determine hydrological cover conditions and hydrologic curve numbers. The Hydrologic curve number for group B soils is about 79, when hydrologic conditions are good, 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.

Wood products

None.

Other information

THREATENED AND ENDANGERED SPECIES:

If any prairie dog towns exist on this site, they are potential habitat for the Black-footed Ferret.

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.

Type locality

Location 1: Moffat County, CO	
Township/Range/Section	TT9N RR96W S27

Other references

Belnap, J. and S. L. Phillips. 2001. Soil biota in an ungrazed grassland: Response to annual grass (*Bromus tectorum*) invasion. *Ecological Applications*: 11: 1261-1275.

Caudle, D., H. Sanchez, J. DiBenedetto, C. Talbot, and M. Karl. 2013. Draft Interagency Ecological Site Handbook for Rangelands. US Dept. of Agriculture. Washington D.C

Cleland, D.T.; Freeouf, J.A.; Keys, J.E., Jr.; Nowacki, G.J.; Carpenter, C; McNab, W.H. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States.[1:3,500,000], Sloan, A.M., cartog. Gen. Tech. Report WO-76. Washington, DC: U.S. Department of Agriculture, Forest Service.

Musgrave, G.W. 1955. How much of the rain enters the soil? In *Water*: U.S. Department of Agriculture Yearbook. Washington, D.C. P. 151-159.

National Engineering Handbook. US Department of Agriculture, Natural Resources Conservation Service. Available: <http://www.info.usda.gov/CED/Default.cfm#National%20Engineering%20Handbook>. Accessed February 25, 2008.

Passey, H. B., W. K. Hugie, E. W. Williams, and D. E. Ball. 1982. Relationships between soil, plant community, and climate on rangelands of the Intermountain west. USDA, Soil Conservation Service, Tech. Bull. No. 1669.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed [8/10/2015].

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Western Regional Climate Center. Retrieved from <http://www.wrcc.dri.edu/summary/Climsmco.html> on May 17, 2018.

Contributors

Suzanne Mayne Kinney

Approval

Kirt Walstad, 2/19/2025

Acknowledgments

Field offices where this site occurs: 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	02/19/2025

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:**
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17. **Perennial plant reproductive capability:**
-