

## Ecological site R034AY426CO Loamy Cold Desert

Last updated: 9/07/2023  
Accessed: 05/13/2025

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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): 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: 75-105 days

### Classification relationships

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 are not slightly saline or saline-sodic.
  - o are deep
  - o are not skeletal within 13" of soil surface, minimal rock fragments at the soil surface; may be skeletal below 13"
  - o are not strongly or violently effervescent in surface mineral 10".
  - o surface textures usually range from loamy sand to sandy loam in surface mineral 2-3".
- Slope is less than 12 percent.
- Clay content is less than 35% and great than 18% in mineral soil surface 1-2".

### Associated sites

R034AY420CO	Cold Desert Breaks
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R034AY421CO	Cold Desert Overflow
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### Similar sites

R034AY423CO	Limy Cold Desert
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i>
Herbaceous	(1) <i>Achnatherum hymenoides</i> (2) <i>Elymus lanceolatus ssp. lanceolatus</i>

### Physiographic features

This site occurs on nearly flat to gently sloping areas. Slopes range from 3 to 12 percent. This site occurs on all aspects. Elevation for the site ranges from 5400 to 6000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Plateau (2) Fan
Runoff class	Low
Flooding frequency	None
Ponding frequency	None
Elevation	1,646–1,829 m
Slope	3–12%
Aspect	Aspect is not a significant factor

### Climatic features

The climate of this site is arid to semi-arid, with precipitation averaging between 7 and 10 inches annually.

The growing season for the native plants averages 160 to 180 days. This usually starts in early April and goes until late September. Cool season grasses start spring growth using moisture stored in the soil from snow melt and spring rains. Optimum growth occurs from Mid-April through mid-June, and continues until the soil profile is depleted of usable soil moisture. A second growth period may occur in the fall months as a result of a fall moisture peak.

The average annual air temperature is about 45 to 48 degrees Fahrenheit. Summer temperatures can reach 100F, and winter temperatures can dip to -30 degrees Fahrenheit. Temperatures fall below the freezing mark much of the time in October through May. The average frost-free period occurs from approximately June 2 through September 15, lasting about 105 days.

Spring and fall are peak periods of precipitation. July is usually the driest month of the year. The seasonal distribution of precipitation and relatively low spring temperatures favor production of cool season plants making the site more productive than the annual precipitation might indicate.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-105 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	178-254 mm

Frost-free period (average)	105 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

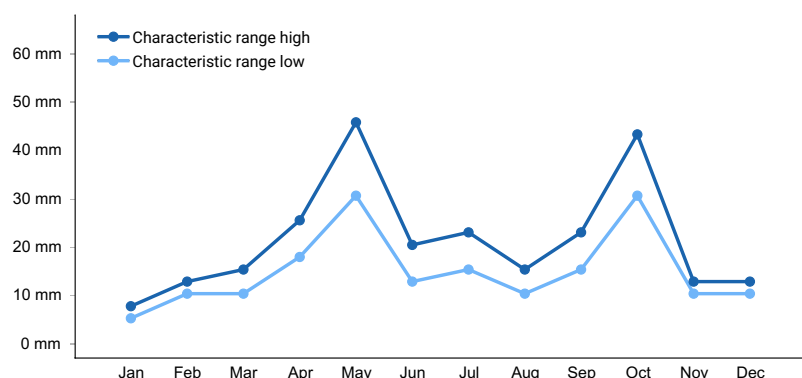


Figure 1. Monthly precipitation range

## Influencing water features

None

## Wetland description

None

## Soil features

Soils of this site are deep and well drained with surface textures of loamy sands, 2 to 3 inches thick. The upper part of the underlying materials are sandy loams from 2 to 14 inches. Below this are sandy loams to greater than 60 inches in the Chroder soils. The Clifsand soils are very cobbly sandy loams from 13 to 43 inches, and extremely stony loamy sands to 60 inches. Depth to the calcic horizon in the Chroder soils is 10 to 20 inches, and 10 to 25 inches in the Clifsand soils. Permeability is moderately rapid, available water holding capacity is low, runoff is low, hazard of water erosion is slight, and hazard of soil blowing is high for Clifsand soils.

Soils associated with this site are:

Chroder sandy loam, 3 to 12 percent slopes

Clifsand-Chroder complex, 3 to 12 percent slopes

Table 4. Representative soil features

Parent material	(1) Eolian deposits (2) Alluvium—sedimentary rock
Surface texture	(1) Loamy sand (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	152 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (0–101.6cm)	9.91–18.03 cm

Calcium carbonate equivalent (0-101.6cm)	30–35%
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–15%
Subsurface fragment volume >3" (0-101.6cm)	0–30%

## Ecological dynamics

The aspect of this site is a grassland-shrub mix.

Historical records and photographs document the fact that the Browns Park Area was under sever grazing pressure by cattle, sheep, and horses during the last half of the 1800's and early 1900's. This pressure significantly altered the native vegetation, particularly in the lowlands immediately adjacent to the Green River and the area north of the river. This has made it difficult to determine the potential natural vegetation.

The dominant grasses are needle and thread, Indian ricegrass, and thickspike wheatgrass. Less abundant grasses are bottlebrush squirreltail, Sandberg bluegrass and muttongrass. Forbs that make up the plant community are sparse, but include stemless spring parsley, foothill deathcamas, and scarlet globemallow. Wyoming big sagebrush is the dominant shrub on this site, with shadscale occurring to a lesser extent.

If ecological retrogression is cattle induced, the percentage and production of desirable plants such needle and thread, Indian ricegrass, Sandberg bluegrass, Pacific aster, shadscale, and winterfat will decrease. If retrogression is sheep induced, the percentage and production of desirable plants such as Indian ricegrass, Pacific aster, Wyoming big sagebrush, shadscale black sagebrush, and winterfat will decrease. Along with the decrease in desirable plants, there will be an increase in plants such as foothill deathcamas, Hoods phlox, tufted evening primrose, plains pricklypear, small low rabbitbrush, broom snakeweed, black greasewood, and annuals such as cheatgrass.

Further evidence of retrogression may be "hedging" of shrubs, sheet erosion, a large increase in annuals, an absence of plant litter and new seedlings, and highly unstable forage production from year to year.

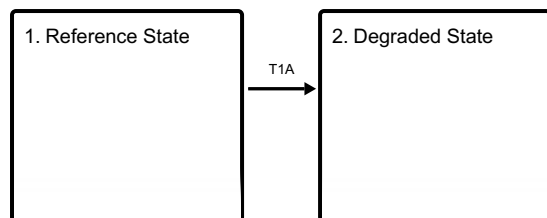
During winters of sever temperatures and snows, there will be heavy use in local areas of Wyoming big sagebrush, shadscale, and winterfat by deer, antelope, livestock, and any elk which may occupy the site. Wildlife and livestock will make use of low palatable species to avoid starvation.

Generally, there is inadequate fuel on this site to carry fire. Should a fire burn across the site, the bunchgrasses will be only slightly benefited, while thickspike wheatgrass will be greatly benefited and small low rabbitbrush, stickyleaf low rabbitbrush, and Nuttall horsebrush will flourish. Shrubs, particularly winterfat, Wyoming big sagebrush, and shadscale will be severely affected, and will be several years recovering. The production will decline the first year and thereafter grasses and forbs will increase, with shrubs having long-term increase.

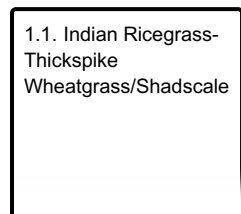
Due to low precipitation of the area, this site will recover slowly from a prolonged and/or severe drought. Grass and forbs will show signs of stress and recovery earlier than shrubs because of their shallow root systems.

## State and transition model

## Ecosystem states



## State 1 submodel, plant communities



## State 1 Reference State

### Community 1.1 Indian Ricegrass-Thickspike Wheatgrass/Shadscale

The plant community is about 50 to 75 percent grasses, 5 to 15 percent forbs, and 20 to 35 percent shrubs (air-dry weight of current seasons growth). Basal area (the area of ground surface covered by the perennial vegetation measured one inch above the soil) is approximately 15 percent when near the potential plant community. Annual Production: If the range is in excellent condition, the approximate total annual production (air-dry) is: Favorable years 600 lbs/ac Normal years 500 lbs/ac Unfavorable years 250 lbs/ac Of the production, 40 percent will likely be unpalatable or out of reach to grazing animals.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	151	347	381
Shrub/Vine	106	157	202
Forb	22	56	90
<b>Total</b>	<b>279</b>	<b>560</b>	<b>673</b>

## 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 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				280–420	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	84–112	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	84–112	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	56–112	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	28–56	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	45–56	–
	muttongrass	POFE	<i>Poa fendleriana</i>	11–28	–
<b>Forb</b>					
2				28–84	
	Fremont's beardtongue	PEFR	<i>Penstemon fremontii</i>	6–11	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	6–11	–
	littleleaf pussytoes	ANMI3	<i>Antennaria microphylla</i>	6–11	–
	plains springparsley	CYAC	<i>Cymopterus acaulis</i>	6–11	–
	Pacific aster	SYCH4	<i>Symphyotrichum chilense</i>	6–11	–
	hoary Townsend daisy	TOIN	<i>Townsendia incana</i>	6–11	–
	foothill deathcamas	ZIPA2	<i>Zigadenus paniculatus</i>	0–6	–
	tufted evening primrose	OECA10	<i>Oenothera caespitosa</i>	0–6	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–6	–
	small-leaf globemallow	SPPA2	<i>Sphaeralcea parvifolia</i>	0–6	–
<b>Shrub/Vine</b>					
3				112–196	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	45–56	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	11–28	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	11–28	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	11–28	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	11–28	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	11–28	–
	Wyoming big sagebrush	ARTRW8	<i>Artemisia tridentata ssp. wyomingensis</i>	11–28	–

## Animal community

### WILDLIFE INTERPRETATIONS:

This site provides habitats which support a resident animal community that is characterized by antelope, mule deer, desert and Nuttall cottontail, white-tailed jackrabbit, prairie dog, sage thrasher, western bluebird, mourning dove, red-tailed hawk, Golden eagle, western meadowlark, and midget faded prairie rattlesnake. There is heavy seasonal use by mule deer in winter and, if the site is adjacent to pinyon-juniper, by elk during the winter months.

This site supports a wide variety of animals. Management should be geared to providing cover and food for the wildlife present. If the site is in poor or fair condition, the food supply will become limited and may force some animals to abandon the site. If range seeding is done, the seeding mixture should meet the needs of wildlife and livestock present. Brush control is not recommended near sage grouse leks.

## GRAZING INTERPRETATIONS:

This site is best suited for winter grazing by cattle. Stock water developments are difficult to establish and therefore are few and far between; which is the reason the site is used mostly in winter. Cattle are usually sent to the high country in June for grazing on Federal land. A system of deferred grazing which varies the season of grazing in pastures during successive years is needed to maintain a healthy, well balanced plant community. Rest during different seasons of the year benefits different plants. Fall and winter rest (October through March) benefits shrubs such as winterfat, shadscale, and Wyoming big sagebrush. Spring rest (March through May) benefits cool-season plant such as needle and thread, Indian ricegrass, thickspike wheatgrass, and Sandberg bluegrass. Deferment during late winter and spring reduces competition between grazing animals for palatable shrubs and forbs.

Plants of particularly high grazing value on this site include Indian ricegrass, muttongrass, Sandberg bluegrass, and winterfat.

Brush management can be accomplished by using herbicides which will minimize soil disturbance caused by mechanical control. Burning in late fall or spring when soil moisture is high may also be an alternative method of brush control. Reseeding is best accomplished in the fall. Seedling establishment is difficult due to low precipitation. Fall is the best time to seed if reseeding is needed. Mechanical disturbance of the soil should be minimized to prevent wind erosion.

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 900 pounds of air-dry forage per animal unit month (AUM). To maintain proper use and allow for forage that disappears through trampling, small herbivore use, weathering, etc. Of the palatable forage produced, 35 percent is considered available for grazing by large herbivores.

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

Excellent - 76-100% - (4.6) (.22)

Good - 51-75% - (7.0) (.14)

Fair - 26-50% - (9.0) (.11)

Poor - 0-25% - (14.0+) (.07)

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.

## Major Poisonous Plants:

Nuttall larkspur can be poisonous to cattle, sheep, and horses. Poisoning results from an alkaloid. Season of most problem is Spring and early summer when forage is in short supply.

Orange Sneezeweed can be poisonous to sheep, cattle, and horses. Poisoning results from toxic glucoside. Season of most problem is when forage is in short supply.

Silvery lupine can be poisonous to sheep and cattle. Poisoning results from an alkaloid and is most serious when forage is in short supply.

## Hydrological functions

This site has good vegetative cover when in good or excellent condition. As cover and residue increases, runoff and water erosion will decrease and there will be greater infiltration of moisture into the soil profile. Efforts to maintain or improve plant cover are recommended, and if the soil is severely disturbed, seeding is necessary to prevent water erosion.

Soils in this site are grouped into "A" hydrologic group, as outlined in the Soils of Colorado Loss Factors and Erodibility Hydrologic Groupings handbook. Field investigations are needed to determine hydrologic cover conditions and hydrologic curve numbers. Refer to Peak Flows in Colorado handbook, and SCS National Engineering Handbook, Section 4, for hydrologic curve numbers in determining runoff quantities.

## Recreational uses

This site has low value for natural beauty. It is a great distance from any population centers and really does not draw people to it for scenic drives, camping or picknicking. It has high recreational value in the form of hunting.

## Wood products

There is no real potential for commercial wood products on this site. However, this site lends itself to tree and shrub plantings for windbreaks, wildlife, and controlling soil erosion. Species which should be considered include Russian olive, Rocky Mountain juniper, and pinyon pine. Sites should be engineered to provide supplemental moisture to promote seedling establishment.

## Other products

### ENDANGERED PLANTS AND ANIMALS:

This site can be important hunting grounds for Peregrine falcons, especially when rock outcrop are present. The site is within the historic range of the black-footed ferret, and any active prairie dog town on this site is potential habitat for the 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	T21N R102W SN
General legal description	SW 1/4, Sec 21, T10N, R102W, in Browns Park, Moffat County, Colorado

## Other references

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## Contributors

Suzanne Mayne Kinney

## Approval

Kirt Walstad, 9/07/2023

## Acknowledgments

Field offices in Colorado where the 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	05/13/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**
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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):**
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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:**
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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):**
- 
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):**
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14. **Average percent litter cover (%) and depth ( in):**
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
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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:

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17. **Perennial plant reproductive capability:**

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