

## **Ecological site R048AY239CO Brushy Mountain Loam**

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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): 048A–Southern Rocky Mountains

MLRA 48A makes up about 45,920 square miles (119,000 square kilometers) and is the southern part of the Rocky Mountains. The Southern Rocky Mountains lies east of the Colorado Plateau, south of the Wyoming Basin, west of the Great Plains, and north of the Rio Grande Rift. It is in western and central Colorado, southeastern Wyoming, eastern Utah, and northern New Mexico. The headwaters of major rivers such as the Colorado, Yampa, Arkansas, Rio Grande, North Platte and South Plate rivers are located here. This MLRA has numerous national forests, including the Medicine Bow National Forest in Wyoming; the Routt, Arapaho, Roosevelt, Pike, San Isabel, White River, Gunnison, Grand Mesa, Uncompahgre, Rio Grande, and San Juan National Forests in Colorado; the Carson National Forest and part of the Santa Fe National Forest in New Mexico. Rocky Mountain National Park also is in this MLRA.

MLRA 48A is the southern Rocky Mountains physiographic region. The Southern Rocky Mountains consist primarily of two belts of strongly sloping to precipitous mountain ranges trending north to south. Several basins, or parks, are between the belts. Some high mesas and plateaus are included. It is characterized by mountain ranges that were uplifted during the Laramide Orogeny and then had periods of glaciation. The ranges include the Sangre de Cristo Mountains, the Laramie Mountains, and the Front Range in the east and the San Juan Mountains and the Sawatch and Park Ranges in the west. The ranges are dissected by many narrow stream valleys having steep gradients. In some areas the upper mountain slopes and broad crests are covered by snowfields and glaciers. Elevation typically ranges from 6,500 to 14,400 feet (1,980 to 4,390 meters) in this area. The part of this MLRA in central Colorado includes the highest point in the Rockies, Mount Elbert, which reaches an elevation of 14,433 feet (4,400 meters). More than 50 peaks in the part of the MLRA in Colorado are at an elevation of more than 14,000 feet (4,270 meters). Many small glacial lakes are in the high mountains.

The mountains in this area were formed mainly by crustal uplifts during the late Cretaceous and early Tertiary periods. This large MLRA can be subdivided into at least 4 large general divisions. First is the Rockies on the east side of this area are called the "Front Range," which is a fault block that has been tilted up on edge and uplifted and is largely igneous and metamorphic geology. It was tilted up on the east edge, so there is a steep front on the east and the west side is more gently sloping and in the south east there are rocks exposed in the mountains are mostly Precambrian igneous and metamorphic rocks. Second is the tertiary rocks, primarily basalt and andesitic lava flows, tuffs, breccias, and conglomerates, are throughout this area (San Juan Mountains Area). The third division is Northwest part of the MLRA is dominantly sedimentary rock from the cretaceous/tertiary and Permian/Pennsylvanian periods. The fourth subset is the long and narrow Sangre de Cristos mountains uplifted in the Cenozoic are between the Rio Grande rift and the great plains. Many of the highest mountain ranges were reshaped by glaciation during the Pleistocene. Alluvial fans at the base of the mountains are recharge zones for local basin and valley fill aquifers. They also are important sources of sand and gravel.

The average annual precipitation ranges predominantly from 12 to 63 inches. Summer rainfall commonly occurs as high-intensity, convective thunderstorms. About half of the annual precipitation occurs as snow in winter; this proportion increases with elevation. In the mountains, deep snowpacks accumulate throughout the winter and

generally persist into spring or early summer, depending on elevation. Some permanent snowfields and small glaciers are on the highest mountain peaks. In the valleys at the lower elevations, snowfall is lighter and snowpacks can be intermittent. The average annual temperature is 26 to 54 degrees F (-3 to 12 degrees C). The freeze-free period averages 135 days and ranges from 45 to 230 days, decreasing in length with elevation. The climate of this area is strongly dependent upon elevation; precipitation is greater, and temperatures are cooler at the higher elevations. The plant communities vary with elevation, aspect and change in latitudes due to changing in precipitation kind and timing and temperature.

The dominant soil orders in this MLRA are Mollisols, Alfisols, Inceptisols, and Entisols. The soils in the area dominantly have a frigid or cryic soil temperature regime and an ustic or udic soil moisture regime. Mineralogy is typically mixed, smectitic, or paramicaceous. In areas with granite, gneiss, and schist bedrock, Glossocryalfs (Seitz, Granile, and Leadville series) and Haplocryolls (Rogert series) formed in colluvium on mountain slopes. Dystrocryepts (Leighcan and Mummy series) formed on mountain slopes and summits at the higher elevations. In areas of andesite and rhyolite bedrock, Dystrocryepts (Endlich and Whitecross series) formed in colluvium on mountain slopes. In areas of sedimentary bedrock, Haplustolls (Towave series) formed on mountain slopes at low elevations and with low precipitation. Haplocryolls (Lamphier and Razorba series), Argicryolls (Cochetopa series), and Haplocryalfs (Needleton series) formed in colluvium on mountain slopes at high elevations.

## **Classification relationships**

NRCS:

Major Land Resource Area 48A, Southern Rocky Mountains (United States Department of Agriculture, Natural Resources Conservation Service, 2006).

USFS:

M331F- Southern Parks and Rocky Mountain Range Section Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

M331G – South Central Highlands Section Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

M331H – North Central Highlands and Rocky Mountains Section Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

M331I – North Parks and Ranges Section Southern Rocky Mountain Steppe - Open Woodland - Coniferous Forest - Alpine Meadow

M341B – Tavaputs Plateau Section M341 Nevada-Utah Mountains Semi-Desert - Coniferous Forest - Alpine Meadow (Cleland, et al., 2007).

EPA:

21a – Alpine Zone, 21b – Crystalline Subalpine Forests, 21c – Crystalline Mid-Elevations Forests, 21d -Foothill Shrublands, 21e – Sedimentary Subalpine Forests, 21f – Sedimentary Mid-Elevation Forests, 21g – Volcanic Subalpine Forests, and 21h – Volcanic Mid-Elevation Forests < 21 Southern Rockies < 6.2 Western Cordillera < 6 Northwestern Forested Mountains North American Deserts (Griffith, 2006).

20c – Semiarid Benchlands and Canyonlands and 20e - Escarpements < 20 Colorado Plateau < 10.1 Cold Deserts < 10 North American Deserts (Griffith, 2006).

USGS: Southern Rocky Mountain Province and the southern part of Unita Basin Section Colorado Plateaus Province

## **Ecological site concept**

Brushy Mountain Loam occurs on mountainsides, mountains, and complex landslides. Slopes is between 3 to 50%. Soils are deep (60+ inches). Soils are derived from colluvium from igneous, metamorphic and sedimentary rock. Soil surface texture is very gravelly sandy clay loam, very stony loam, or gravelly loam with loamy-skeletal or clayey-

skeletal textured subsurface. It is a Mountain Mahogany - Gambel's oak community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

## Associated sites

R048AY247CO	<b>Deep Clay Loam</b> Deep Clay Loam occurs on hills, hillsides, mountain-slope, complex landslides, alluvial fans, and structural benches. Slopes is between 0 to 35%. Soils are deep (60+ inches). Soils are derived from colluvium and slide deposits from igneous, metamorphic and sedimentary rocks, and/or alluvium, residuum or complex landslide deposits from shale. Soil surface texture is loam, clay loam or silty clay loam with fine-textured subsurface. It is a mountain big sagebrush – western wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY245CO	<b>Mountain Swale</b> Mountain Swale occurs flood plains, alluvial fans, swales, stream terraces, and valley floors. Slopes is between 0 to 12%. Soils are deep (60+ inches) in depth. Soils are derived from alluvium. Soil surface texture is loam, with a fine-loamy subsurface. It is a basin wildrye-western wheatgrass community. It has a typic ustic moisture. The effective precipitation ranges from 16 to 20 inches. It receives extra moisture from surrounding uplands that drain into the area. These areas are sloped themselves and drain into perennially wet areas. They have well drained soils and ephemeral streams.
R048AY238CO	<b>Brushy Loam</b> Brushy Loam occurs on hills, mountains, complex landslides, and benches. Slopes is between 3 to 35%. Soils are moderately deep to deep (20 to 60+ inches), soils derived from colluvium, residuum, slope alluvium and alluvium from sandstone and shale. Soil surface texture is loam or clay loam with fine-textured subsurface. It is a Gambel's oak – slender wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

## Similar sites

R048AY238CO	<b>Brushy Loam</b> Brushy Loam occurs on hills, mountains, complex landslides, and benches. Slopes is between 3 to 35%. Soils are moderately deep to deep (20 to 60+ inches), soils derived from colluvium, residuum, slope alluvium and alluvium from sandstone and shale. Soil surface texture is loam or clay loam with fine-textured subsurface. It is a Gambel's oak – slender wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY248CO	<b>Mountain Clay Loam</b> Mountain Clay Loam occurs on alluvial fans, mesas, hills and mountain slopes. Slopes is between 0 to 35%. Soils are deep to very deep (40 to 60+ inches). Soils are derived from alluvium and slope alluvium from shale; or alluvium, slope alluvium, colluvium and/or residuum from sandstone and shale. Soil surface texture is loam or a clay loam with fine-textured subsurface. It is Arizona Fescue – western wheatgrass – Gambel's Oak community. It has a typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 16 to 20 inches.
R048AY303CO	<b>Loamy Slopes</b> Loamy Slopes occurs on alluvial fans, terraces, hills mountains and mountainsides. Slopes is between 25 to 65%. Soils are moderately deep to deep (20 to 60+ inches). Soils are derived from alluvium from sandstone and siltstone or sandstone; residuum or colluvium from sandstone or outwash from basalt. Soil surface texture is cobbly sandy loam or cobbly, very flaggy or channery loam with loamy-skeletal textured subsurface. It is a mountain mahogany – Indian ricegrass community. It has an aridic ustic moisture regime and frigid temperature. The effective precipitation ranges from 12 to 18 inches.
R048AY379CO	<b>Brushy Slopes</b> Brushy Slopes occurs on canyons. Slopes is between 25 to 75%. Soils are moderately deep (20 to 40 inches). Soils are derived from colluvium or residuum from sandstone. Soil surface texture is cobbly sandy loam with loamy textured subsurface. It is a mountain big sagebrush – muttongrass community. It has a typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 16 to 20 inches.

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	(1) <i>Cercocarpus montanus</i> (2) <i>Quercus gambelii</i>

Herbaceous	(1) <i>Muhlenbergia montana</i> (2) <i>Elymus elymoides</i>
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## Physiographic features

This site is on gentle sloping to steep mountain slopes ranging from 3 to 50 percent. Typical appearance is large, open grass areas interspersed with somewhat smaller areas of shrubs. Elevation ranges from 7000 to 9500 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Mountainside (2) Mountain slope (3) Complex landslide
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	7,000–9,500 ft
Slope	3–50%
Aspect	Aspect is not a significant factor

## Climatic features

Average annual precipitation is about 16 to 20 inches. Of this, approximately 45-55% falls as snow, and 45-55% falls as rain between middle of May to and the end of September. Summer moisture is mostly from thundershowers in July, August and September. December to February is the driest period of the year with the driest month being January. July thru September is the wettest period and the wettest month is usually August. The average annual total snowfall is 84.9 inches. The snow depth usually ranges from 1 to 5 inches during November thru March. The highest winter snowfall record in this area is 127 inches which occurred in 2007-2008. The lowest snowfall record is 46.5 inches during the 2017-2018 winter. The frost-free period typically ranges from 80 to 120 days. The last spring frost is typically the middle of June to the end of June. The first fall frost is usually the end of August to the middle of September. Adequate moisture from snow melt exists for early, cool-season grasses and forbs; their growth generally begins in April. Later cool-season grasses such as mountain muhly begin growth in May. Warm-season grasses, such as blue grama, start growth around May 15th, but are dependent on summer rain showers for the majority of their growth. Shrub growth commences in early May.

Mean daily annual air temperature ranges from about 25.5°F to 60.3°F, averaging about 24°F for the winter and 61.8°F in the summer. Summer high temperatures of mid-70°F to low 80°F are not unusual. The coldest winter temperature recorded was -36°F on February 2, 1985 and the warmest winter temperature recorded was 65°F on December 5, 1995. The coldest summer temperature recorded was 19°F on June 2, 1990 and the warmest was 98°F on July 31, 2002. Wide yearly and seasonal fluctuations are common for this climatic zone. Data taken from Western Regional Climate Center (2018) for Ridgway, Colorado Climate Station.

This zone in MLRA 48 will need to be broken up into at multiple land resources zones in future projects based on current knowledge of precipitation and temperature patterns.

West Central Zone Stations: Alterbern, Aspen, Avon, Glenwood Springs #2, Shoshone, Placerville and Ridgway. This LRU zone is use in write up above. Driest month is usually January, February and June and wettest months are July, August and September.

Northwest Zone Climate Stations: Meeker and Yampa are at the low end of this LRU zone. Driest months usually are January and February. Wettest months usually are April and August.

Southwest Zone Climate Stations (Precambrian sedimentary and igneous): There are no climate stations in this LRU zone.

Southwest Volcanics: There are no climate stations in this LRU zone.

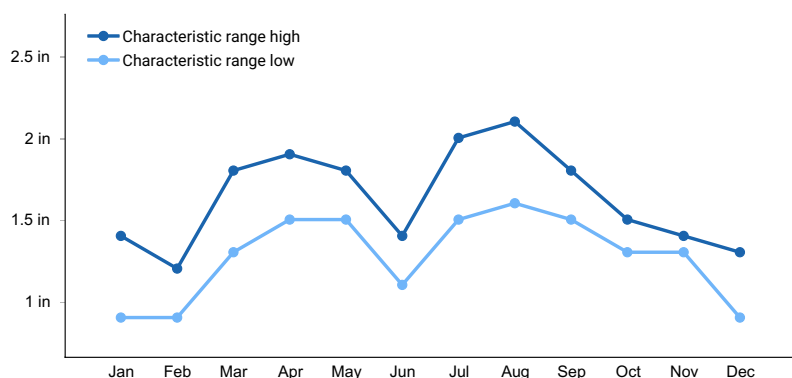
Northeast (Front Range Igneous and Metamorphic): Cabin Creek, Caribou Ranch, Dillion 1 R, Fraser, Georgetown, Grand lake 1 NW, Hourglass Reservoir, Nederland 2 NNE, Red Feathers Lakes, Red Feather Lakes 2 SE and Victor. April, May, July and August are the wettest months. February, December, November and October are the driest. The climate stations in this zone are cryic. These areas have shorter growing seasons by 20 to 40 days over the frigid stations.

Southeast (Sangre de Cristo Mtns): There are no climate stations in this zone in MLRA 48A. Closest ones are in MLRA 49. The growing season appears to be longer on the Sangre de Cristos. Driest months are December to February and the wettest are July & August.

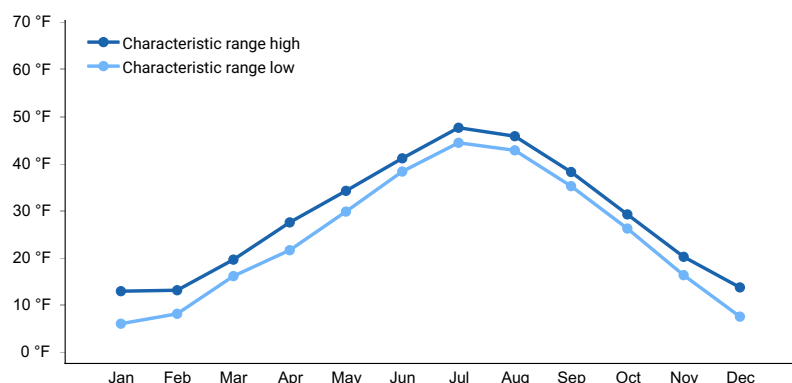
Cryic High elevation valleys: Pitkin, Taylor River and Meredith. These areas have shorter growing seasons by 20 to 40 days over the frigid stations.

**Table 3. Representative climatic features**

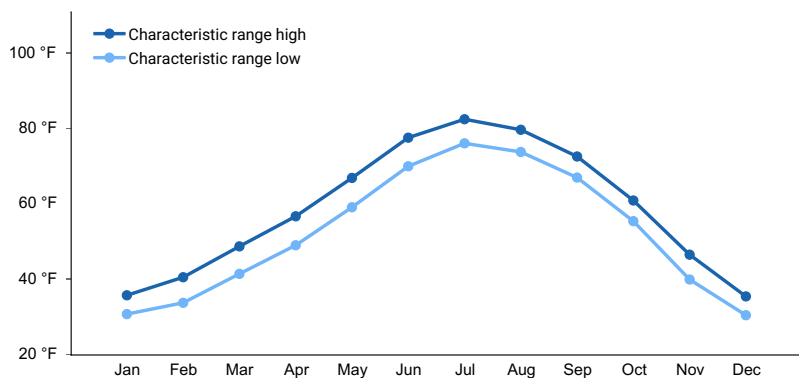
Frost-free period (characteristic range)	23-78 days
Freeze-free period (characteristic range)	75-111 days
Precipitation total (characteristic range)	17-18 in
Frost-free period (actual range)	5-101 days
Freeze-free period (actual range)	43-134 days
Precipitation total (actual range)	17-19 in
Frost-free period (average)	54 days
Freeze-free period (average)	92 days
Precipitation total (average)	18 in



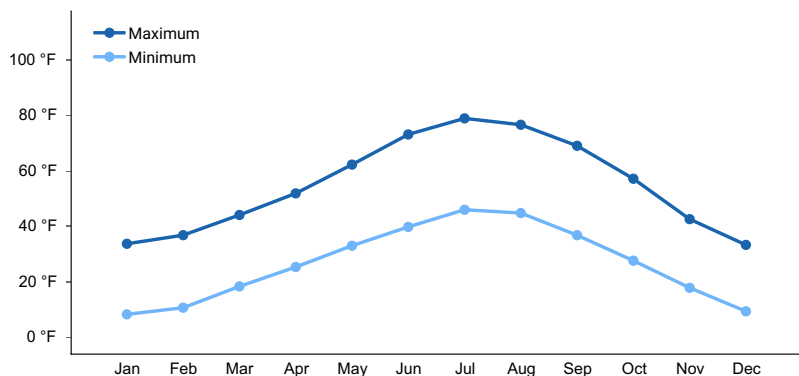
**Figure 1. Monthly precipitation range**



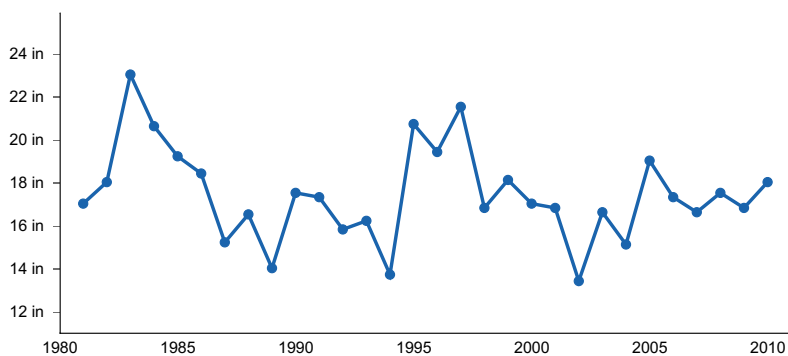
**Figure 2. Monthly minimum temperature range**



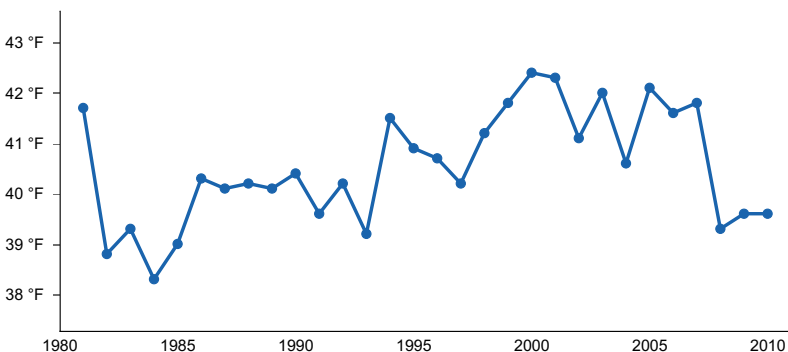
**Figure 3. Monthly maximum temperature range**



**Figure 4. Monthly average minimum and maximum temperature**



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) GEORGETOWN [USC00053261], Idaho Springs, CO
- (2) GLENWOOD SPGS #2 [USC00053359], Glenwood Springs, CO
- (3) FRASER [USC00053116], Fraser, CO

- (4) HOURGLASS RSVR [USC00054135], Bellvue, CO
- (5) RIDGWAY [USC00057020], Ridgway, CO
- (6) YAMPA [USC00059265], Toponas, CO
- (7) ASPEN PITKIN CO AP [USW00093073], Aspen, CO

## Influencing water features

None

## Soil features

These soils are medium textured gravelly soils which have formed on the moderately sloping mountain sides from colluvium. Water intake rate and water movement through the soil profile is moderate. Roots penetrate the soil profile to 60 inches or more. Rock fragments are present throughout the soil profiles and is skeletal (>35% rock fragments)

Soil name

Loamy-skeletal - Ess

Clayey-Skeletal - Shanley

**Table 4. Representative soil features**

Parent material	(1) Colluvium—igneous, metamorphic and sedimentary rock
Surface texture	(1) Very gravelly sandy clay loam (2) Very stony, gravelly loam
Family particle size	(1) Loamy-skeletal (2) Clayey-skeletal
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	10–35%
Surface fragment cover >3"	0–10%
Available water capacity (Depth not specified)	3–5.5 in
Soil reaction (1:1 water) (Depth not specified)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	30–40%
Subsurface fragment volume >3" (Depth not specified)	5–25%

## Ecological dynamics

This shrub-grass dominated site is characterized by large open patches of grass interspersed by heavy stands of brush species. Forbs are abundant. The plant community is about 60 percent grass, 15 percent forbs, and 25 percent shrubs air-dry weight.

Dominant grasses are mountain muhly, bottlebrush squirreltail, needleandthread, and blue grama. Less abundant grasses are Schribner needlegrass, Indian ricegrass, nodding brome, muttongrass, and elk sedge. Forbs present in the plant community include Louisiana sage, Nuttall sunflower, sidebells penstemon, yellow eriogonum, and several others.

Shrubs that dominate on the site are mountain mahogany, Gambel oak, rockspirea, and mountain snowberry. Numerous other shrubs and half-shrubs occur on this site along with minor amounts of pinyon pine and Rocky Mountain juniper.

Retrogression induced by continuous grazing by cattle or elk would occur primarily on the gentler slopes near the bottoms. In these areas, cool-season grasses such as Parry oatgrass, nodding brome, and mountain muhly would be the first to disappear. Western wheatgrass, bottlebrush squirreltail, and needleandthread may initially increase with the loss of more palatable species, however, these grasses would also soon decline especially with continuous early season grazing each year. All of the forbs listed above except sidebells penstemon would tend to increase.

Shrubs which would tend to increase under overgrazing by cattle would include fringed sagebrush, rubber rabbitbrush, granite gillia, and to some extent Gambel oak. Cheatgrass would tend to invade on this site with continued retrogression. Retrogression induced by deer would decrease mountain mahogany, mountain snowberry, fendler ceanothus, and skunkbush sumac.

Extended periods of time without livestock or wildlife use or without fire would encourage increased domination by brushy species, and reduced value of this site for use by domestic livestock or elk. Fire is a natural occurrence on this site, and would serve to keep brush species such as mountain mahogany, and rockspirea in a less dominant, vegetative stage. Fire would also serve to reduce infestation by plains prickly pear.

Basal area (the area of ground surface covered by the perennial vegetation measured one inch above the soil) is approximately 25 percent.

#### Annual production

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

Favorable years 1800 pounds/Ac

Noraml years 1200 pounds/Ac

Unfavorable years 900 pounds/Ac

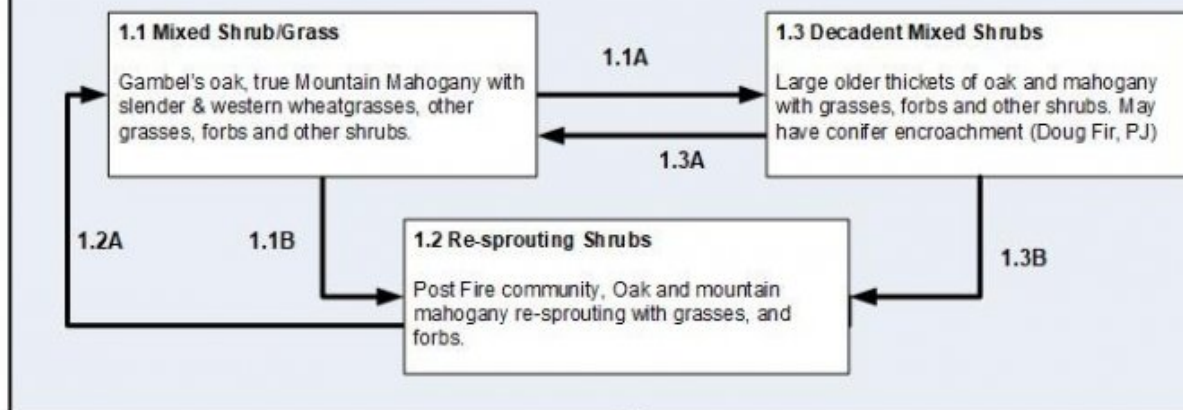
Of this production, 20-25 percent will likely be unpalatable or out of reach of grazing animals.

#### **State and transition model**



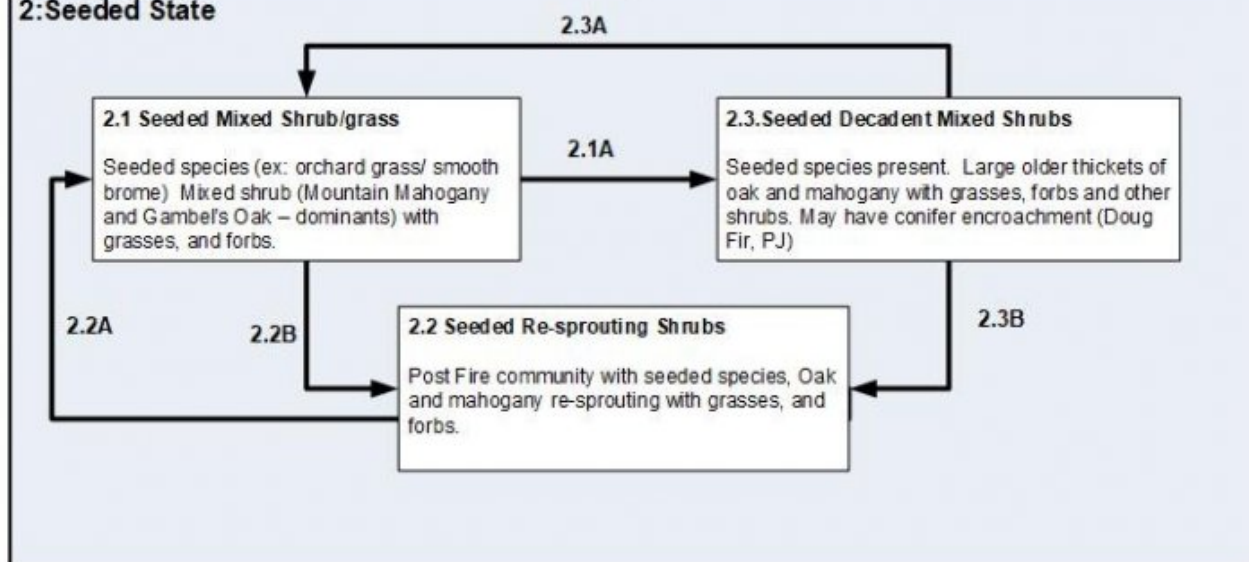
## R048AY239CO Brushy Mountain Loam

### State 1: Reference State



T1A

### 2: Seeded State



## Legend

1.1A, 2.1A – lack of fire/disturbance, time without disturbance, lack of insect/pathogen outbreaks, and/or possible tree encroachment (pinyon, or Doug fir)

1.1B, 1.3B, 2.1B, 2.3B – fire/natural disturbance, insect/pathogens outbreaks, and/or tree encroachment removal

1.2A, 2.2A – lack of fire/disturbance, time without disturbance, lack of insect/pathogen outbreaks

1.3A, 2.3A – natural disturbance, insect/pathogens outbreaks and/or tree encroachment removal on a smaller scale

T1A – Seeding, and/or vegetative treatments (fire, mechanical, chemical) of shrubs and/trees

**State 1**  
**Reference State**

**Community 1.1**

## Reference State

Annual production If the range is in excellent condition, the approximate total annual production (air-dry) is: Favorable years 1800 pounds/Ac Noraml years 1200 pounds/Ac Unfavorable years 900 pounds/Ac Of this production, 20-25 percent will likely be unpalatable or out of reach of grazing animals.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	555	720	1165
Shrub/Vine	230	330	450
Forb	115	150	185
<b>Total</b>	<b>900</b>	<b>1200</b>	<b>1800</b>

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Grasses</b>			600–840	
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	240–300	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	180–240	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	120–180	–
	nodding brome	BRAN	<i>Bromus anomalus</i>	35–120	–
	Scribner needlegrass	ACSC11	<i>Achnatherum scribneri</i>	60–120	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–85	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	35–60	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	25–60	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	10–60	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–35	–
	Parry's oatgrass	DAPA2	<i>Danthonia parryi</i>	0–25	–
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	0–25	–
<b>Forb</b>					
2	<b>Forbs</b>			120–180	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	50–70	–
	Nuttall's sunflower	HENU	<i>Helianthus nuttallii</i>	35–60	–
	sidebells penstemon	PESE11	<i>Penstemon secundiflorus</i>	25–60	–
	James' buckwheat	ERJAX	<i>Eriogonum jamesii</i> var. <i>xanthum</i>	25–50	–
	northwestern Indian paintbrush	CAAND	<i>Castilleja angustifolia</i> var. <i>dubia</i>	10–35	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	10–25	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–10	–
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	0–10	–
	Inyo buckwheat	ERLA4	<i>Eriogonum latens</i>	0–10	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–10	–

Shrub/Vine					
3	Shrubs			240–420	
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	60–180	–
	rockspirea	HODU	<i>Holodiscus dumosus</i>	60–120	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	60–120	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	35–60	–
	wax currant	RICE	<i>Ribes cereum</i>	35–60	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	25–60	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	25–35	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	25–35	–
	Fendler's ceanothus	CEFE	<i>Ceanothus fendleri</i>	0–25	–
	gooseberry currant	RIMO2	<i>Ribes montigenum</i>	10–25	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–25	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–25	–
	mountain ball cactus	PESI	<i>Pediocactus simpsonii</i>	0–10	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	0–10	–
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	0–10	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	0–10	–

## Animal community

### INTERPRETATIONS FOR LIVESTOCK GRAZING:

This site provides fair summer and fall forage for cattle or sheep. Slope and accessibility tend to severely restrict value for cattle grazing

Early grasses such as needleandthread and bottlebrush squirreltail tend to grow and mature before normal grazing season begins. The mature seedheads are not utilized and are obvious over most of the site. Where early spring grazing could be practiced, range should be deferred once every three years. Mountain muhly, blue grama, prairie Junegrass, and elk sedge are normally more heavily utilized during the summer growing season.

Livestock, especially cattle, tend to use steep slopes only slightly, and concentrate on associated bottom land sites. For this reason, increasing stocking density for shorter grazing periods and allowing longer deferments would result in more uniform utilization of this site as well as needed rest for associated bottomland sites.

### Guide to initial stocking rates:

Stocking rates 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., 35 percent of the palatable forage produced is considered available for grazing by large herbivores. Because of steep slopes, only 50 percent of this site was considered accessible.

Condition % climax

Class Vegetation Ac/AUM AUM/Ac

Excellent 76-100 5.4 0.18

Good 51-75 7.2 0.14

Fair 26-50 12.0 0.08

Poor 0-25 19.2 0.05

Adjustments to the initial stocking rates should be made as needed to obtain proper use. With specialized grazing systems, large livestock breeds, uncontrolled big game herbivores, inaccessibility, dominant season use, presence of introduced species, etc., stocking rate adjustments will be required.

## INTERPRETATIONS FOR WILDLIFE:

Mule deer are the dominant big game animal. Elk are present seasonally. Blue grouse, cottontail, nongame birds, and small mammals use the site for most of the year.

Ecological retrogression induced through cattle grazing would reduce the value of this site for winter range for elk, but have little affect on deer habitat.

## Hydrological functions

Soils in this site are grouped into the "B" hydrologic group, as outlined in the Soils of Colorado Loss Factors and Erodibility Hydrologic Groupings 1979 Handbook. Field investigations are needed to determine hydrologic cover conditions and hydrologic curve numbers. Refer to NRCS National Engineering Handbook, Section 4, and Peak Flows in Colorado Handbook for more information.

## Recreational uses

This site is most aesthetically pleasing during the early spring and summer months when forbs are in full bloom. Fall is an excellent time to observe changing colors of Gamble oak, skunkbush, snowberry, and wax current.

Deer and elk both use this site extensively for food and for cover. The southern aspect makes it high quality winter habitat for both deer and elk. Blue grouse, cottontail, nongame birds, and small mammals find abundant habitat for most of the year in the varied grass-shrub plant community. The juxtaposition of this site to open grassland sites and pinyon-juniper woodland makes it especially valuable.

## Wood products

Wood products are minor. Limited use of occasional pinyon pine or Rocky Mountain juniper for firewood may occur. Gamble oak rarely develops enough stem diameter to be valuable for firewood.

## Other information

Major poisonous plants to livestock 3/  
Plant Livestock Type of Season  
Common Name Affected Poisoning Serious  
Gambel oak cattle acute spring  
Lamberts Crazyweed all accumulative spring  
Threadleaf groundsel cattle, horses accumulative early spring

3/ For additional information regarding poisoning by specific plants see Colorado Range Technical Note

### Similar sites:

A burned ponderosa pine woodland site can be easily confused with this site. In this climatic zone and on deeper south facing soils, competition from deeper rooted brush species and the warm, arid climate do not support the extensive ponderosa pine stands that may occur on other aspects and soils. Gamble oak would also be much more dominant on the burned ponderosa pine woodland site.

## Type locality

Location 1: Fremont County, CO	
General legal description	High south facing slopes above Devil's Hole and South Tallahassee Creek in Fremont County, T18S, R73W, unsectionalized.

## Other references

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Those involved in developing earlier versions of this site description include: Bob Rayer, retired NRCS Soil Scientist; Herman Garcia, retired CO State RMS and NRCS MLRA Ecological Site Specialist-QA Phoenix, AZ.

**--Site Development and Testing Plan--:**

Future work to validate and further refine the information in this Provisional Ecological Site Description is necessary. This will include field activities to collect low-, medium-, and high-intensity sampling, soil correlations, and analysis of that data.

Additional information and data is required to refine the Plant Production and Annual Production tables for this ecological site. The extent of MLRA 48A must be further investigated.

Field testing of the information contained in this Provisional ESD is required. As this ESD is moved to the Approved ESD level, reviews from the technical team, quality control, quality assurance, and peers will be conducted.

## **Contributors**

Suzanne Mayne-Kinney

## **Approval**

Kirt Walstad, 3/05/2024

## **Acknowledgments**

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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	05/10/2025
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):**

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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):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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):

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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:

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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:**
-