

## **Ecological site R048AY379CO Brushy Slopes**

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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 Slopes occurs on canyons. Slopes is between 25 to 75 percent. 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.

## Associated 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.
R048AY228CO	<b>Mountain Loam</b> Mountain Loam occurs mainly alluvial fans, mountain slopes, benches, terraces, or hills. Slopes average between 5 and 10% but can range from 0 to 30%. Soils are moderately deep to deep (20-60 inches) loamy soils derived from residuum from igneous and metamorphic rocks or sandstone and shale; slope alluvium from sandstone and shale, or igneous and metamorphic rocks; colluvium from igneous and metamorphic rocks or sandstone and shale, and/or alluvium from igneous and metamorphic rocks. Soil surface texture are loam, sandy loam or silt loam with loamy subsurface. It is a Mountain Big Sagebrush - Arizona Fescue community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
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.

## Similar sites

R048AY239CO	<b>Brushy Mountain Loam</b> 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.
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.
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.
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.

Table 1. Dominant plant species

Tree	Not specified
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Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> (2) <i>Arctostaphylos patula</i>
Herbaceous	(1) <i>Elymus trachycaulus</i> (2) <i>Poa fendleriana</i>

## Physiographic features

Elevation: Low 7000 feet High 8000 feet.

Percent slope: Low 25 percent High 75 percent

Topography of this site is very steep canyon side slopes. There is quite a bit of vegetative variation in this site because of this feature. Slopes usually face east, north, and west. This also creates variation in the vegetation.

**Table 2. Representative physiographic features**

Landforms	(1) Canyon
Runoff class	Very high
Flooding frequency	None
Ponding frequency	None
Elevation	7,000–8,000 ft
Slope	25–75%
Aspect	W, N, E

## 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. 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)	51-92 days
Freeze-free period (characteristic range)	92-118 days
Precipitation total (characteristic range)	17 in
Frost-free period (actual range)	44-106 days
Freeze-free period (actual range)	89-137 days
Precipitation total (actual range)	17 in
Frost-free period (average)	72 days
Freeze-free period (average)	107 days
Precipitation total (average)	17 in

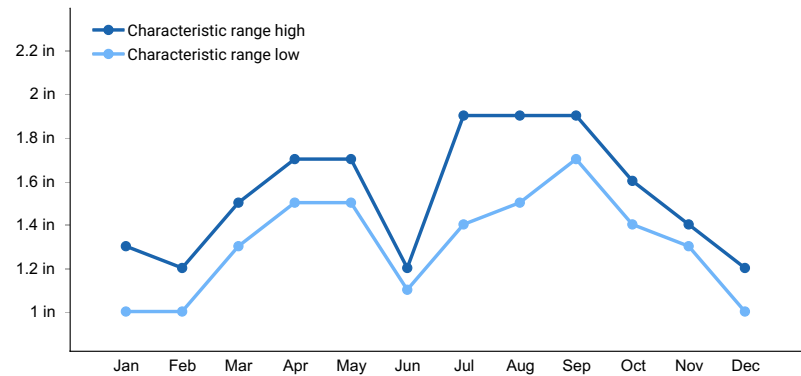


Figure 1. Monthly precipitation range

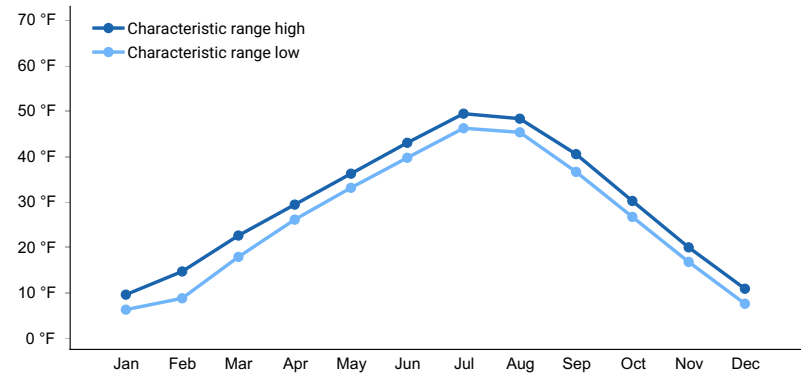
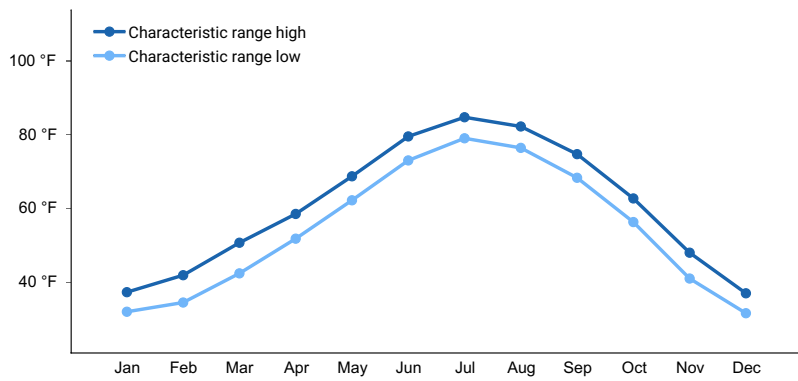
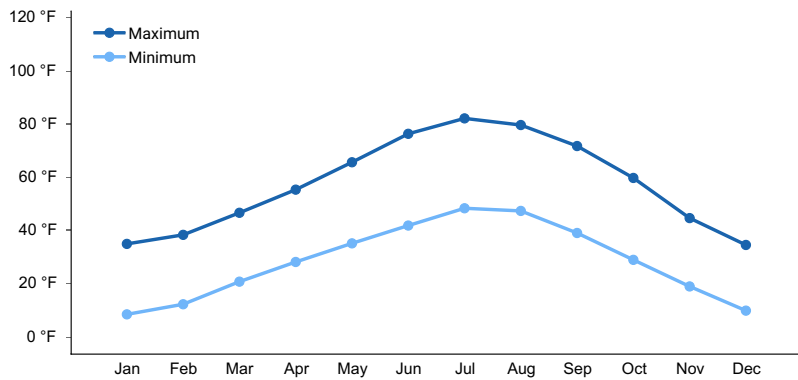


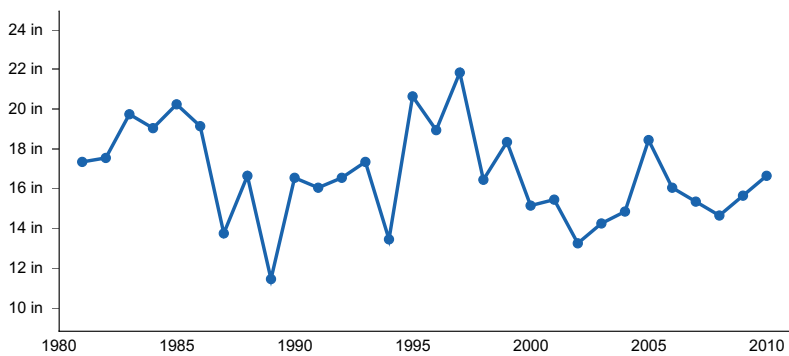
Figure 2. Monthly minimum temperature range



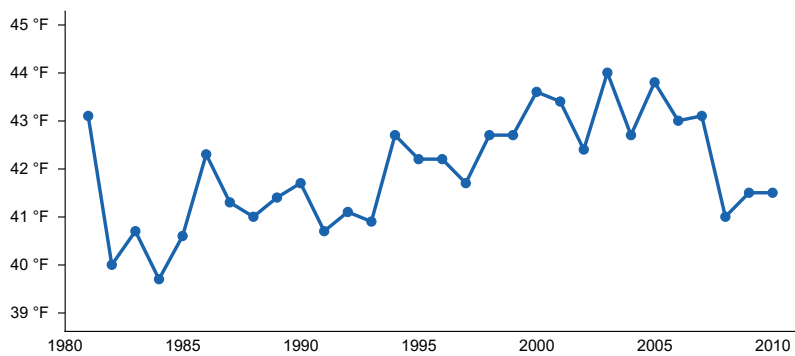
**Figure 3. Monthly maximum temperature range**



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



**Figure 5. Annual precipitation pattern**



**Figure 6. Annual average temperature pattern**

## Climate stations used

- (1) GLENWOOD SPGS #2 [USC00053359], Glenwood Springs, CO
- (2) RIDGWAY [USC00057020], Ridgway, CO
- (3) YAMPA [USC00059265], Toponas, CO

- (4) ASPEN PITKIN CO AP [USW00093073], Aspen, CO

## Influencing water features

None

## Soil features

The surface layer (0 to 10 inches thick) is brown cobbly fine sandy loam. Sub soil (10 to 22 inches) is yellowish brown very cobbly fine sandy loam. Substratum (22 to 29 inches) is light yellowish brown very cobbly fine sandy loam. Bedrock at 20-40 inches is sandstone. The soil surface has stones and boulders of approximately 15 percent on the surface. The soil is moderately deep. The soil is well drained and has moderately rapid permeability. The available soil capacity is very low. Rooting depth is 20 to 40 inches.

Soil correlated to this site is Veatch cobbly fsl 25-75 percent slopes.

**Table 4. Representative soil features**

Parent material	(1) Colluvium—sandstone (2) Residuum—sandstone
Surface texture	(1) Cobbly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	20–40 in
Surface fragment cover <=3"	5–15%
Surface fragment cover >3"	5–15%
Available water capacity (Depth not specified)	2–3 in
Subsurface fragment volume <=3" (Depth not specified)	10–15%
Subsurface fragment volume >3" (Depth not specified)	15–25%

## Ecological dynamics

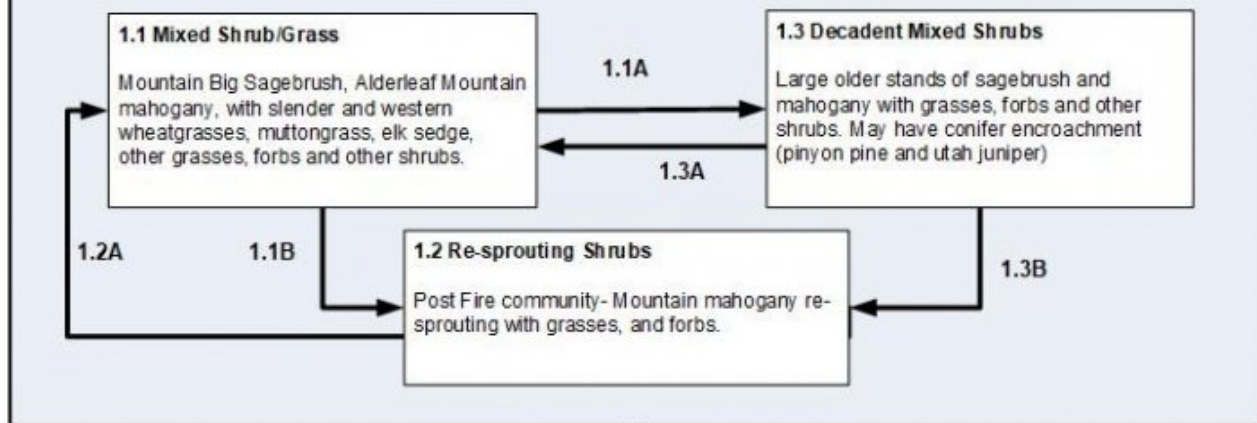
The appearance of this site is varied. Lower elevations on west facing slopes can support Utah Juniper while higher elevations on west slopes support Gamble oak with an understory of grass. North facing slopes can support aspen with an understory of grass and forbs.

The state and transition model was added to fill the provisional ecological site instruction. It is a very general model.

## State and transition model

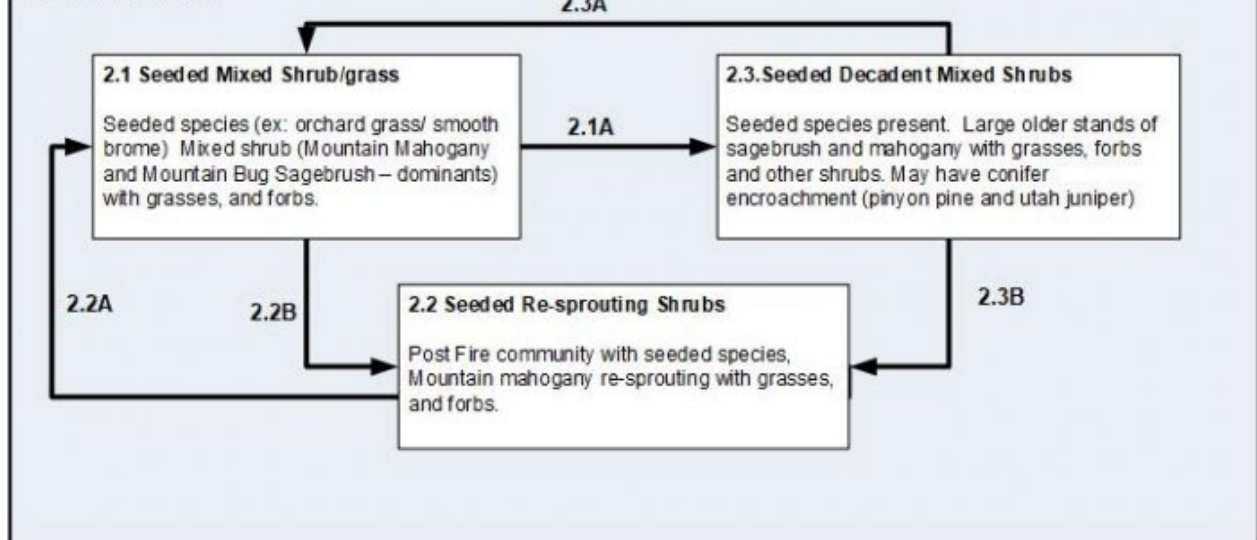
## R048AY379CO Brushy Slopes

### 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

Ground cover and structure: % Canopy cover Average % Basal Vertical view Hight (ft) area cover  
Grasses/grasslikes 25 1.0 5 Forbs 2 0.5 1 Shrubs 10 4.0 2 Trees 10 10.0 1 Annual production is distributed as follows: Grasses and Grasslikes 35-60% of the total Forbs 5-15% of the total Shrubs and half shrubs 35-60% of the total Trees 0-30% of the total In excellent condition, the approximate total annual production (air-dry) is as follows: Favorable 1000 lbs/Ac Average 600 lbs/Ac Unfavorable 400 lbs/Ac Stocking rates given below are based on continuous use for the entire growing season and are intended only as an initial guide. About 40-70 percent of the total production (by air-dry weight) will likely be unpalatable or out of reach of grazing animals. Forage needs are calculated on the basis of 900 lbs 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. Condition Percent Climax Class Vegetation AUM/Ac Ac/AUM Ac/AU Excellent 76-100 .15-.11 6.7-9.1 80-109 Good 51-75 .11-.08 9.1-12.5 109-150 Fair 26-50 .08-.05 12.5-20.0 150-240 Poor 0-25 .05-.02 20.0-50.0 240-600 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, inaccessibility, dormant season use, presence of introduced forage species, seeded rangeland etc., stocking rate adjustments will be required. Site Degradation: This site is very fragile. When site degradation starts, it is very difficult to stop. Most of the grasses and shrubs are palatable so if grazing is excessive, they will become less vigorous. When this occurs, soil erosion by water can start and can become very severe. Cattle rarely graze this site except in the very bottom of the valley due to the steep slopes. Game trails may start erosion but usually the density is not enough to be a problem. In the areas prone to producing pinyon pine, can become dominated by pinyon pine if fire is excluded from the ecosystem for an extended period of time.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	235	315	595
Shrub/Vine	115	150	185
Tree	25	75	125
Forb	25	60	95
Total	400	600	1000

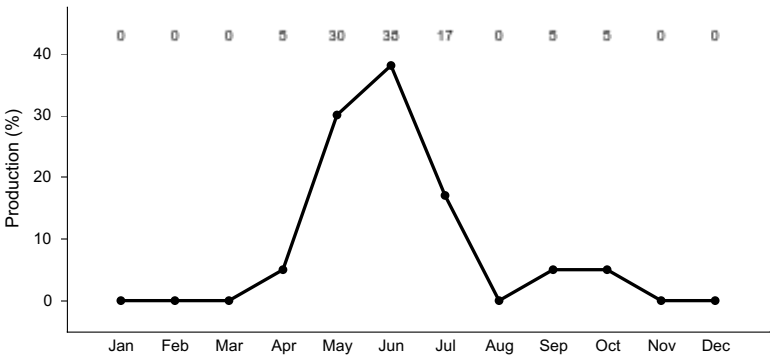


Figure 8. Plant community growth curve (percent production by month). CO0105, MLRA 48A - Mountain Sites. MLRA 48A.

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	Cool Season Bunchgrasses			175–375	
	squirreldtail	ELEL5	<i>Elymus elymoides</i>	30–60	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus ssp. trachycaulus</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–

	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–30	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–30	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–30	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	0–30	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	0–30	–
	mountain brome	BRMA4	<i>Bromus marginatus</i>	0–30	–
2	<b>Grass-Likes</b>			15–45	
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	30–60	–
3	<b>Cool Season Rhizomatous</b>			15–45	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	30–60	–
4	<b>Warm Season Grasses</b>			0–15	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–30	–
<b>Forb</b>					
5	<b>Forbs</b>			30–90	
	arrowleaf balsamroot	BASA3	<i>Balsamorhiza sagittata</i>	0–30	–
	sulphur-flower buckwheat	ERUMM	<i>Eriogonum umbellatum</i> var. <i>majus</i>	0–24	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–24	–
	silvery lupine	LUAR3	<i>Lupinus argenteus</i>	0–24	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	0–18	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–18	–
	stemless four-nerve daisy	TEACA2	<i>Tetrameuris acaulis</i> var. <i>acaulis</i>	0–18	–
	spiny milkvetch	ASKE	<i>Astragalus kentrophyta</i>	0–12	–
	Rocky Mountain penstemon	PEST2	<i>Penstemon strictus</i>	0–12	–
	wormleaf stonecrop	SEST2	<i>Sedum stenopetalum</i>	0–12	–
	smooth white aster	SYPO4	<i>Symphiotrichum porteri</i>	0–12	–
<b>Shrub/Vine</b>					
6	<b>Resprouters</b>			120–180	
	greenleaf manzanita	ARPA6	<i>Arctostaphylos patula</i>	30–180	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	60–180	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	0–120	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	30–120	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	30–90	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	30–90	–
	yellow rabbitbrush	CHVIV4	<i>Chrysothamnus viscidiflorus</i> ssp. <i>viscidiflorus</i> var. <i>viscidiflorus</i>	0–30	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–30	–
	wild crab apple	PERA4	<i>Peraphyllum ramosissimum</i>	0–30	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	0–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	0–20	–
7	<b>Non-Sprouting Shrubs</b>			30–90	

	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	90–180	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0–30	–
8	<b>succulent</b>			0–15	
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–30	–
<b>Tree</b>					
9	<b>Trees</b>			30–120	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	0–120	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	0–120	–
	quaking aspen	POTR5	<i>Populus tremuloides</i>	0–60	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	0–60	–

## Animal community

### INTERPRETATIONS FOR GRAZING ANIMALS:

This site has very little value for grazing domestic livestock due to the extremely steep slopes. Wildlife such as deer and elk make good use of this site for grazing and cover due to the wide variety of vegetation that is available on this site.

### INTERPRETATIONS FOR WILDLIFE:

This community evolved with periodic fires changing the vegetation from woody to herbaceous species development every 40 to 80 years. For wildlife, it is preferable to have a mix of large and small areas interspersed in various stages of development. Practices that regress woody species such as sagebrush by spraying, brush beating, and prescribed burns benefit some wildlife. However, other wildlife depend on mature sagebrush in specific areas to provide habitat during critical periods of the year. Critical habitat areas should be identified and treatments should be timed to insure that sufficient areas in mature sagebrush remain available for wintering mule deer and sage grouse.

#### Wildlife species list:

Rocky Mountain elk, mule deer, black bear, coyote, Nuttall's cottontail, white-tailed jackrabbit, sagebrush vole, Richardson's ground squirrel, thirteen-line ground squirrel, northern harrier, Swainson's hawk, red-tailed hawk, tiger salamander, mourning dove, black-headed growbeak, Virginia's warbler, black-capped chickadee, pronghorn, band-tailed pigeon, golden-mantled ground squirrel, sage grouse, blue grouse, golden eagle, pine siskin, American robin, horned lark, Brewer's sparrow, vesper sparrow, chipping sparrow, ??gree-tailed towhee??, western garter snake, sagebrush lizard, western rattlesnake, rufous-sided towhee, green-tailed towhee, dusky flycatcher, downy woodpecker, wild turkey, and Cooper's hawk.

## 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

### RECREATION AND NATURAL BEAUTY:

The area occupied by this site is rugged and therefore appears as beautiful country to many people. It is steep and remote so it can be good wildlife habitat. Where access is available, it provides good hunting.

## Wood products

The site can produce a few Christmas trees, some firewood, and fence posts, however the site is remote, difficult to travel with steep slopes limiting access.

## Other information

### MAJOR POISONOUS PLANTS TO LIVESTOCK:

Gray Horsebrush (*Tetradymia canescens*) can be poisonous to sheep in early spring when sheep graze the buds. 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 (bighead), neck, ears, eyelids, and nose. This is especially common in sheep that have been exposed to sunlight. One kg (2.2 pounds) a day for two days or ½ of 1% of the animals weight in early spring is fatal to sheep. The poison is cumulative.

Broom snakeweed (*Xanthocephalum sarothrae*) is poisonous to cattle and sheep when forage is scarce. Poisoning is not common but will occur on overgrazed ranges. Causes abortion in cattle or may produce weak, underweight calves. Losses are sporadic and will occur when 10-20 percent of the body weight of green material is consumed in ½ to 20 weeks.

Gamble oak can be poisonous to cattle and sheep in early spring during budding and leafing and after a frost. As leaves mature, toxicity decreases.

Silvery lupine (*Lupinus argenteus*) is poisonous to all livestock occasionally. It is poisonous when other forage is scarce and if hay contains immature lupine pods (especially dangerous during seed stage). Lupine seeds are toxic to sheep when .25 to 1.5 percent of the animals body weight is consumed in one feeding. 150 to 175 gm (.33 to .38 lbs) per day has been lethal to sheep. The toxic substance is a non cumulative alkaloid. Small amounts ingested over a period of time create no difficulties.

### ENDANGERED PLANTS AND ANIMALS:

Cliffs adjacent to this site are potential peregrine falcon nesting sites.

## Type locality

Location 1: Mesa County, CO	
General legal description	This site is generally situated in the steep north-south canyons on the south side of Glade Park.

## Other references

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## Contributors

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Approval

Kirt Walstad, 3/05/2024

Acknowledgments

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--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.

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	05/03/2024
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):**

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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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