Ecological site R048AY252CO
Subalpine Clay

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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

Ecological site concept

R048AY252CO Subalpine Clay occurs on complex landslides, mountain slopes, mountainsides, and dip slopes. Slopes is between 0 to 40 percent. Soils are moderately deep to very deep (39to 60+ inches). Soils are derived from complex landslide deposits from igneous, metamorphic and sedimentary rock; colluvium from shale; colluvium and/or slide deposits over residuum weathered from igneous and sedimentary rock. Soil surface texture is loam,

clay loam or silt loam with fine-textured subsurface. It is Thurber's Fescue – western wheatgrass – mountain snowberry. It has an ustic udic/typic udic moisture regime and cryic temperature regime. The effective precipitation ranges from 20 to 30 inches.

Associated sites

R048AY241CO	**Mountain Meadow** R048AY241CO Mountain Meadow occurs flood plains, stream terraces, drainageways, ephemeral streams, flood-plain step and depressions. This site has natural sub-irrigation. Slopes is between 0 to 12%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from alluvium from sandstone and shale, sedimentary rock, igneous, metamorphic and sedimentary rock, or shale. Soil surface texture is loam, silty clay loam, clay loam, clay, sandy clay loam or sandy loam with fine-loamy or fine textured subsurface. It has a typic aquic or oxyaquic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY250CO	**Subalpine Loam** R048AY250CO Subalpine Loam occurs on hills, mountain-slopes, and mountains. Slopes is between 1 to 30%. Soils are deep to very deep (20 to 60+ inches). Soils are derived from colluvium and alluvium from volcanic rock; complex landslide deposits from igneous, metamorphic, and sedimentary rock; and slope alluvium, colluvium, residuum, alluvium or complex landslide deposits from sandstone and shale or shale. Soil surface texture is loam with loamy textured subsurface. It is a mountain big sagebrush – Thurber's Fescue community. It has an ustic udic/typic udic moisture regime and cryic temperature regime. The effective precipitation ranges from 20 to 30 inches.
F048AY449CO	**Aspen Woodland** Aspen Woodland is a permanent type aspen stand in Western Colorado. Common plants in the Aspen understory are snowbrush, myrtle brush bluebells, cow parsnip, wild celery, wild carrot, blue wildrye, mountain brome, breaded wheatgrass, and Columbia needlegrass. Soils are deep, dark, loamy textured and high in organic matter. It is usually ustic udic and can be frigid or cryic. Precipitation ranges from 20 to 30 inches, but on favorable north and east aspect it can be found as low as 18

Similar sites

R048AY247CO	**Deep Clay Loam** This site is similar to the Deep Clay Loam range site, however, it occurs at higher elevations where precipitation is more abundant. R048AY247CO 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.
R048AY250CO	**Subalpine Loam** R048AY250CO Subalpine Loam occurs on hills, mountain-slopes, and mountains. Slopes is between 1 to 30%. Soils are deep to very deep (20 to 60+ inches). Soils are derived from colluvium and alluvium from volcanic rock; complex landslide deposits from igneous, metamorphic, and sedimentary rock; and slope alluvium, colluvium, residuum, alluvium or complex landslide deposits from sandstone and shale or shale. Soil surface texture is loam with loamy textured subsurface. It is a mountain big sagebrush – Thurber's Fescue community. It has an ustic udic/typic udic moisture regime and cryic temperature regime. The effective precipitation ranges from 20 to 30 inches. This site is similar to a Subalpine Loam site. Major differences are the soils of this site are much finer textured, gray colored, and are derived from shale. This site has no mountain big sagebrush or silver sagebrush which are present in the Subalpine Loam site. Thurber fescue is less abundant on this site than on the Subalpine Loam. Western wheatgrass is more abundant than on the Subalpine Loam site.
R048AY248CO	**Mountain Clay Loam** R048AY248CO 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.

R048AY257CO	**Clayey Valley** R048AY257CO Clayey Valley occurs on hillslopes, and old high terraces. Slopes is between 1 to 12%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from slope alluvium from shale or mixed alluvium from sandstone and shale. Soil surface texture is loam or clay loam with fine textured subsurface. It is Western wheatgrass – Arizona Fescue. It has a Typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 18 to 22 inches.
R048AY234CO	**Mountain Clay** R048AY234CO Mountain Clay occurs on hills, mesas, and alluvial fans. Slopes is between 0 to 25%. Soils are moderately deep to deep (20 to 60+ inches). Soils are derived from colluvium, slope alluvium, residuum and/or eolian deposits from sandstone and shale. Soil surface texture is loam, clay loam or very cobbly loam with a fine textured subsurface. It is a black sagebrush – western wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Symphoricarpos oreophilus* (2) *Dasiphora fruticosa*
Herbaceous	(1) *Festuca thurberi* (2) *Pascopyrum smithii*

Physiographic features

This site occurs on complex landslides, dip slopes and mountainous terrain on gentle and moderate slopes. Slopes range from 3 to 25 percent but can range up to 40 percent. Elevation for this site ranges from 8300 to 10000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Complex landslide (2) Mountain slope (3) Mountainside (4) Dip slope
Runoff class	High to very high
Flooding frequency	None
Ponding frequency	None
Elevation	8,300–10,000 ft
Slope	3–40%
Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation is about 20 to 30 inches. Of this, approximately 65-75% falls as snow, and 25-35% falls as rain between middle of June to and the middle of September 1. Summer moisture is mostly from thundershowers in July, August and September. May to June is the driest period of the year with the driest month being June. December thru March is the wettest period and the wettest month is usually January. The average annual total snowfall is 198.5 inches. The snow depth usually ranges from 4 to 35 inches during November thru April. The highest winter snowfall record in this area is 354.5 inches which occurred in 1964-1965. The lowest snowfall record is 68.5 inches during the 1914-1915 winter. The frost-free period typically ranges from 25 to 90 days. The last spring frost is typically the end of June to the middle of July. The first fall frost is the first week of August to the first week of September. Mean daily annual air temperature is about 17.9ºF to 51.5ºF, averaging about 13.6ºF for the winter and 54.9ºF in the summer. Summer high temperatures of 70ºF to mid-70ºF are not unusual. The coldest winter temperature recorded was -47ºF on February 6, 1982 and the warmest winter temperature recorded was 13.6ºF on December 18, 1917. The coldest summer temperature recorded was 15ºF on June 20, 1920 and the warmest was 95 ºF on July 17, 1949. Wide yearly and seasonal fluctuations are common for this climatic zone. Data taken from Western Regional Climate Center (2018) for Crested Butte, Colorado Climate

Station.

This zone in MLRA 48 will need to be broken up into at least 7 land resources zones in future projects based on current knowledge of precipitation and temperature patterns.

West Central Zone Stations: use in write up above. Driest month is June and wettest months are December thru March.

Northwest Zone Climate Stations: Marvine Ranch, Pyramid, Vail and Winter Park. Driest month is June and the wettest period is October thru April.

Southwest Zone Climate Stations (Precambrian sedimentary and igneous): Cascade, Electra Lake, Rico, Silverton, Telluride 4 WNW and Trout Lake. This area has driest month as June and the wettest months are July and August.

Southwest Volcanics: Platoro and Rio Grande Reservoir. The driest month is June and the Wettest are August and March.

Northeast (Front Range Igneous and Metamorphic): Allen's Park 2 NNW, Allen's Park NNW, Breckenridge, Climax, Jones Pass 2E, and Squaw Mountain. April, May, July and August are the wettest months. February, December, November and October are the driest.

Southeast (Sangre de Cristo Mtns): North Lake – This is the only climate station in this zone. It driest months are December and January with July being the wettest. So, this area receives more summer precipitation than other zones in this climate zone.

Frigid high elevation valleys: Aspen 1 SW, Ouray, Tacoma, Gross Reservoir, Coal Creek Canyon, Steamboat Springs, Marvine, and Buckskin Mtn 1 E. These areas have longer growing seasons by 20 to 40 days over the cryic stations.

Table 3. Representative climatic features

Frost-free period (characteristic range)	5-36 days
Freeze-free period (characteristic range)	40-76 days
Precipitation total (characteristic range)	23-26 in
Frost-free period (actual range)	3-46 days
Freeze-free period (actual range)	32-88 days
Precipitation total (actual range)	21-27 in
Frost-free period (average)	19 days
Freeze-free period (average)	56 days
Precipitation total (average)	24 in

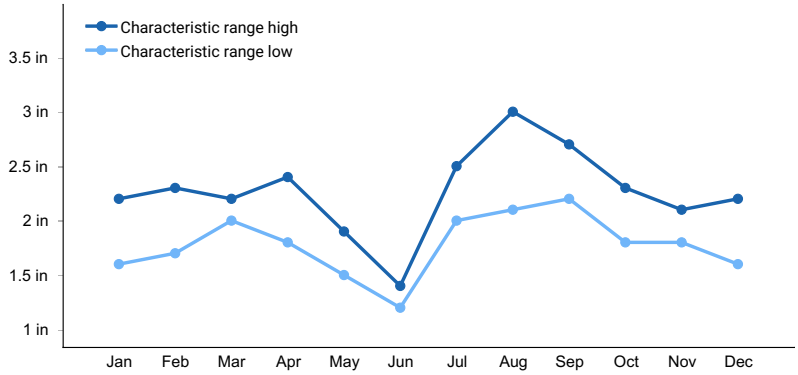


Figure 1. Monthly precipitation range

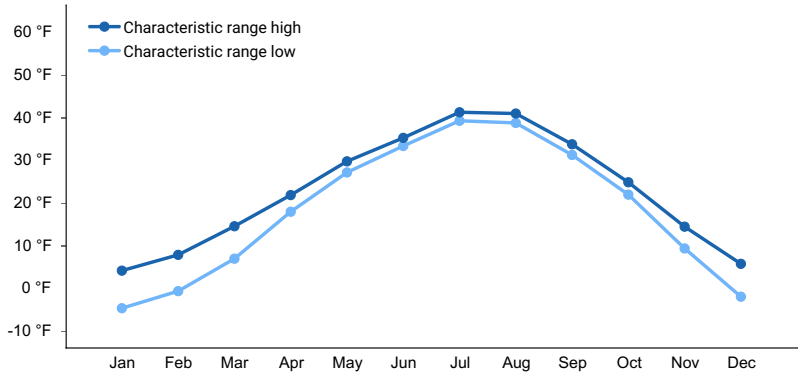


Figure 2. Monthly minimum temperature range

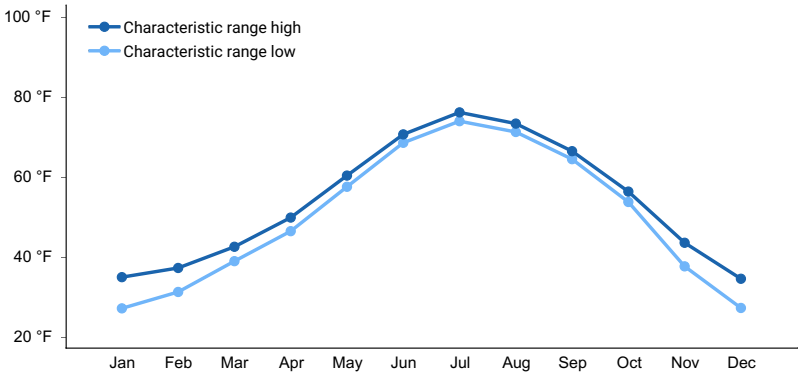


Figure 3. Monthly maximum temperature range

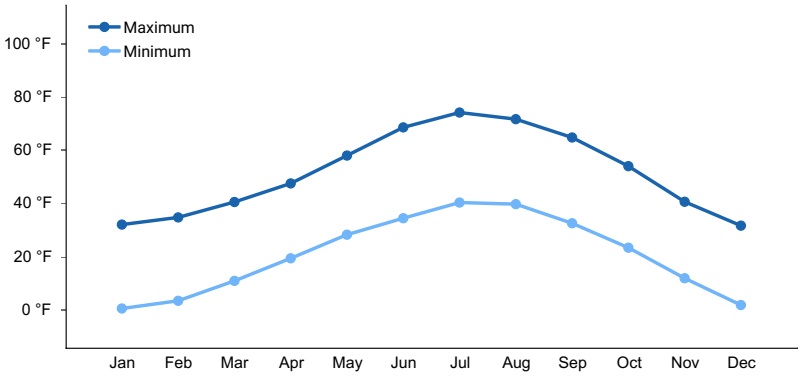


Figure 4. Monthly average minimum and maximum temperature

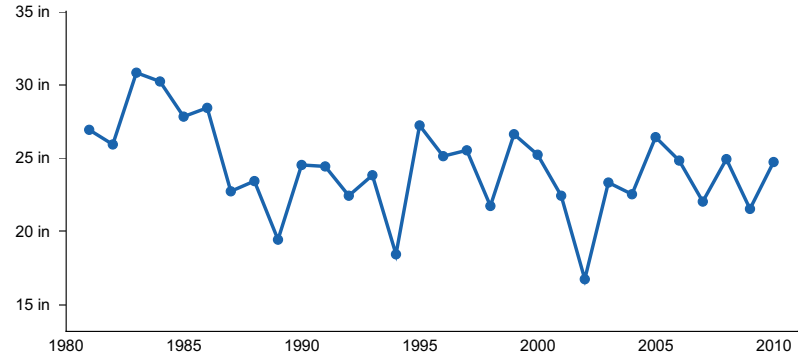


Figure 5. Annual precipitation pattern

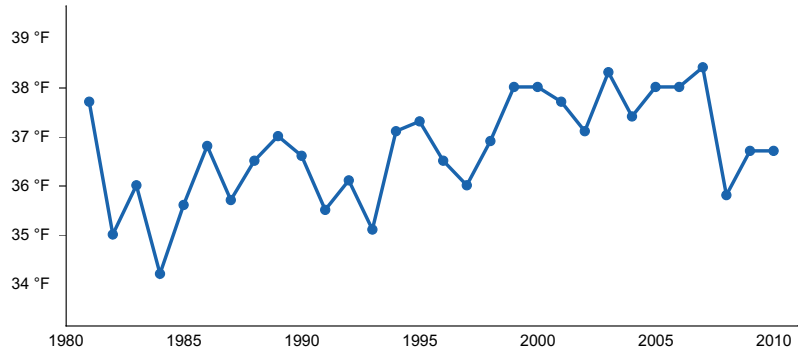


Figure 6. Annual average temperature pattern

Climate stations used

- (1) SILVERTON [USC00057656], Silverton, CO
- (2) TELLURIDE 4WNW [USC00058204], Telluride, CO
- (3) VAIL [USC00058575], Vail, CO
- (4) CLIMAX [USC00051660], Leadville, CO
- (5) CRESTED BUTTE [USC00051959], Crested Butte, CO
- (6) MARVINE RCH [USC00055414], Meeker, CO
- (7) RICO [USC00057017], Cahone, CO
- (8) RIO GRANDE RSVR [USC00057050], Lake City, CO

Influencing water features

None

Soil features

Typically, the soils are well drained, fine textured, and moderately deep to very deep over bedrock. The surface is loam, clay loam, or silt loam, and more than 1 percent organic matter. Reaction is slightly acid to mildly alkaline.

Major soils which are associated with this site are:

Gothic, Jerry, Leaps, Sneffels and Cochetopa-like

Table 4. Representative soil features

Parent material	(1) Colluvium–igneous and sedimentary rock (2) Residuum–igneous and metamorphic rock (3) Colluvium–sandstone and shale (4) Residuum–sandstone and shale (5) Slope alluvium–sandstone and shale (6) Complex landslide deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Fine
Drainage class	Well drained
Permeability class	Moderately slow to slow
Soil depth	39–60 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–4%

Available water capacity (Depth not specified)	5.1–8 in
Electrical conductivity (Depth not specified)	0–1 mmhos/cm
Soil reaction (1:1 water) (Depth not specified)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Table 5. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	4.7 in
Electrical conductivity (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The plant community is made up of about 65-80% grasses, 10-15% forbs, and 20-30% shrubs.

Dominant grasses are slender wheatgrass, Thurber fescue, western wheatgrass, and Letterman needlegrass. Less abundant grasses are nodding brome, mountain brome, prairie Junegrass, and alpine timothy.

Forbs present in the plant community include sulfur buckwheat, western yarrow, and mulesear wyethia.

Shrubs, half-shrubs, and trees that occur on this site are shrubby cinquefoil, mountain snowberry, and Woods rose.

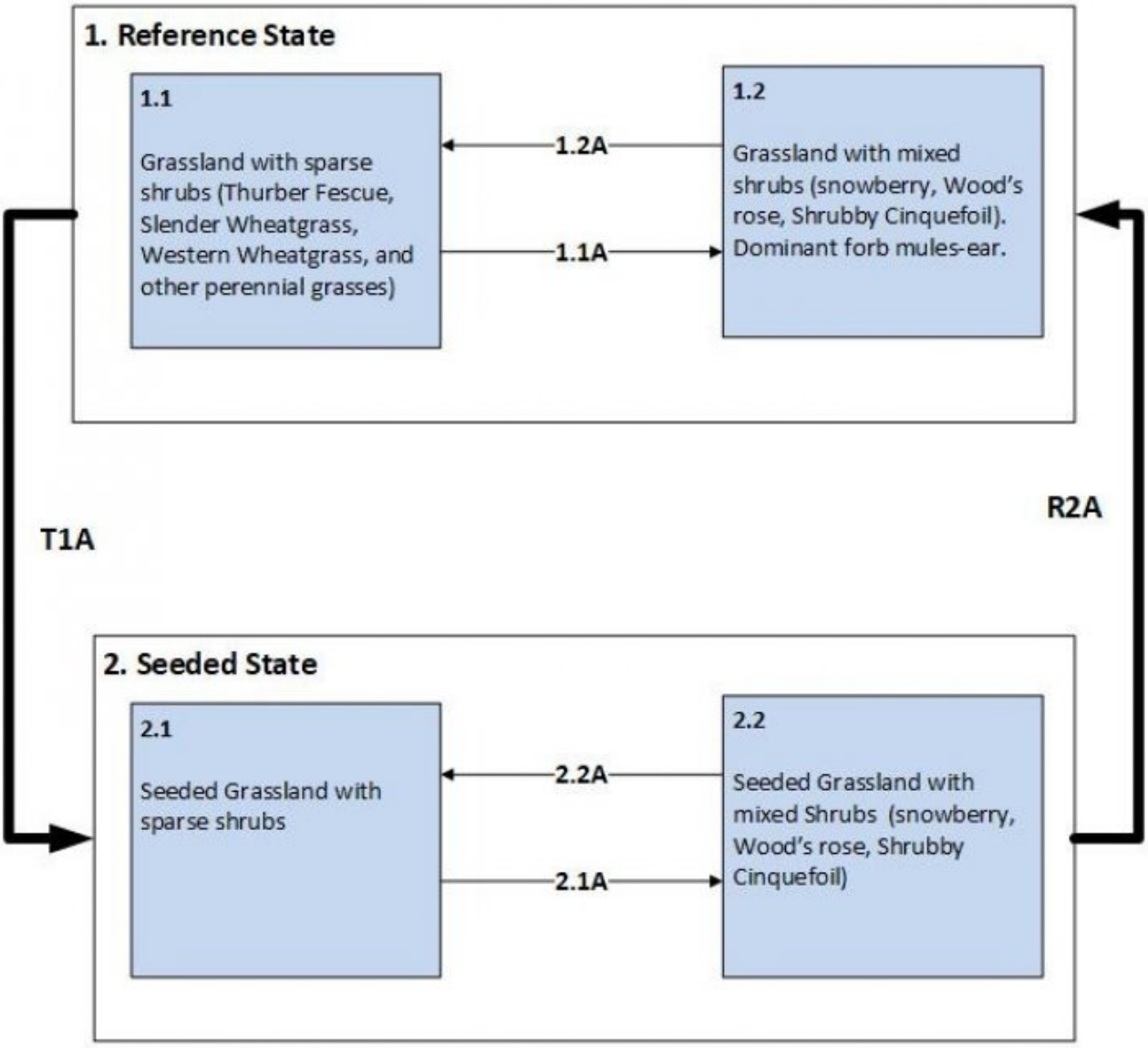
When cattle and/or horses overgraze, plants most likely to increase are forbs and shrubs. Kentucky bluegrass will invade the site in the early stages of retrogression. Mulesear wyethia and rabbitbrush will increase to the exclusion of almost all species under severe overgrazing. With overgrazing by sheep, most forbs will disappear, and grasses will increase. Mulsear wyethia will take over and crowd out desirable plants under severe overgrazing.

Basal area(the area of ground surface covered by the perennial vegetation measured one inch above the soil) is approximately 40 percent when near the potential plant community.

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

State and transition model

R048AY252CO Subalpine Clay



Legend

1.1A, 2.1A – lack of fire, time without disturbance and improper grazing
1.2A, 2.2A – fire, insect herbivory, browsing of shrubs, and/or drought

T1A – Seeding
R2A – natives re-established over extended time periods; extensive inputs and energy may be needed

State 1
Reference State

Community 1.1
Reference State

The plant community is made up of about 65-80% grasses, 10-15% forbs, and 20-30% shrubs. When cattle and/or horses overgraze, plants most likely to increase are forbs and shrubs. Kentucky bluegrass will invade the site in the early stages of retrogression. Mulesear wyethia and rabbitbrush will increase to the exclusion of almost all species under sever overgrazing. With overgrazing by sheep, most forbs will disappear, and grasses will increase. Mulesear wyethia will take over and crowd out desirable plants under sever over grazing. Basal area (the area of ground surface covered by the perennial vegetation measured one inch above the soil) is approximately 40 percent when near the potential plant commuity. If the range is in excellent condition, the approximate total annual production (air-dry) is: Favorable years 3000 pounds/Ac Normal years 2300 pounds/Ac Unfavorable years 1800 pounds/Ac Of this production, 30 percent will likely be unpalatable or out of reach to grazing animals.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1205	1440	1975
Shrub/Vine	370	575	650
Forb	225	290	375
Total	**1800**	**2305**	**3000**

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			1495–1840	
	Thurber's fescue	FETH	*Festuca thurberi*	575–805	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	345–575	–
	western wheatgrass	PASM	*Pascopyrum smithii*	345–575	–
	alpine timothy	PHAL2	*Phleum alpinum*	45–115	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	45–115	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	45–115	–
	nodding brome	BRAN	*Bromus anomalus*	45–115	–
	mountain brome	BRMA4	*Bromus marginatus*	45–115	–
Forb					
2	**Forbs**			230–345	
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	45–115	–
	mule-ears	WYAM	*Wyethia amplexicaulis*	45–115	–
	twolobe larkspur	DENU2	*Delphinium nuttallianum*	0–25	–
	owl's-claws	HYHO	*Hymenoxys hoopesii*	0–25	–
Shrub/Vine					
3	**Shrubs**			460–690	
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	230–345	–
	shrubby cinquefoil	DAFRF	*Dasiphora fruticosa ssp. floribunda*	115–230	–
	Woods' rose	ROWO	*Rosa woodsii*	115–230	–

Animal community

INTERPRETATIONS FOR GRAZING ANIMALS:
This site is rated as very high for summer use by both cattle and sheep. It has a high proportion of palatable species and good production potential. Slopes are not a problem on this site. Periodic deferment or a rotational grazing system through the summer months will allow maintenance and improvement of the plant community.

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. These figures are based on native species. Stocking rates may be higher if Kentucky bluegrass and similar invaders have become a part of the plant community.

Condition percent climax
Class vegetation Ac/AUM AUM/Ac
Excellent 76-100 1.1 .91
Good 51-75 1.4 .71
Fair 26-50 2.8 .35
Poor 0-25 5.0 .20

Adjustment 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, dormant season use, presence of introduced species, above or below normal moisture, etc., stocking rate adjustments will be required.

INTERPRETATIONS FOR WILDLIFE:

This site is used extensively by deer and elk in the late spring, summer, and fall months. Smaller mammals using the site include marmots.

If site condition deteriorates, the site generally becomes less valuable for big game, so care is needed to prevent this deterioration. In good to excellent condition, the site is most useful to elk.

Hydrological functions

In high condition, plant cover protects the soil from raindrop impact, sheet, and rill erosion. However, this soil is highly erodible if bare ground is exposed.

Soils in this site are grouped into the “C” 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:
This site occurs in the spruce, fir, aspen zone. Therefore, the site is cool and moist, and supports a plant community which is pleasing. Hiking, picnicking, and camping are popular recreational activities. The site is also good summer habitat for deer and elk. Therefore, in years with mild weather, the site can be used extensively by big game hunters.

Wood products

This site is not a wood-products producing site. Aspen, Englemann spruce, and subalpine fir are in the general vicinity, but do not occur here. Living snow fences may be planted on this site. Trees most suitable are englemann spruce and subalpine fir. Small basins should be constructed around the trees for moisture. The area should be graded so water does not pond near the trees.

Other information

MAJOR POISONOUS PLANTS TO LIVESTOCK3/
Nuttall larkspur (Delphinium nuttallianum) can be poisonous to cattle, horses, and rarely sheep in spring and early summer when other green forage is not available. Poisoning is cumulative. Symptoms include loss of appetite, salvation, muscular twitching, general uneasiness, and staggering gait. In advanced cases the animal falls and lies with feet extended more or less rigidly. Poisoned animals are constipated and severe cases are nauseated and bloating may occur.

Orange sneezeweed can be poisonous to sheep, cattle, and horses. The type of poisoning is toxic glucoside and is poisonous when forage is short.

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

ENDANGERED PLANTS AND ANIMALS:
No endangered or threatened species have been identified. Species names to be included as reliable information becomes available.

OTHER INTERPRETATIONS:
The best conservation treatment of this range site is good rangeland management. Proper use of the existing vegetation is the key to productivity on this site. Competition from shrubs is generally not a problem here, so brush control is generally not needed. If mulesear wyethia becomes dominant, spraying may be needed along with seeding in extreme situations.

Location:
The site occurs in San Miguel, Montrose, Montezuma, and La Plata counties.

Type locality

Location 1: San Miguel County, CO	
Township/Range/Section	TT42N RR12W S15
General legal description	NW ¼ Sec 15, T42N, R12W, San Miguel County, Colorado.

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

Indicators

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

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

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

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

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

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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

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

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**