USDA Natural Resources Conservation Service

Ecological site R048AY250CO
Subalpine Loam

Last updated: 3/05/2024
Accessed: 04/20/2024

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

Subalpine Loam occurs on hills, mountain-slopes, and mountains. Slopes is between 1 to 30 percent. 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.

Associated sites

R048AY251CO	**Shallow Subalpine** Shallow Subalpine occurs on hills, mesas, plateau, mountain-slope, and structural benches. Slopes is between 0 to 30%. Soils are very shallow to shallow (4 to 20 inches) in depth. Soils are derived from slope alluvium, colluvium, or residuum from sandstone and shale; colluvium, slope alluvium, or residuum from basalt; colluvium from tuff breccia, rhyolite or andesite; or residuum from andesite, rhyolite or tuff breccia. Soil surface texture is loam, channery loam, sandy loam, gravelly silt loam, gravelly loam or extremely stony loam, with a loamy or loamy-skeletal subsurface. If soil is loamy-skeletal, the majority rock fragments that make it skeletal are below 20-24 inches in depth. It is a mountain big sagebrush – Columbia wheatgrass community. It has an ustic udic/typic udic moisture regime and cryic temperature regime. The effective precipitation ranges from 20 to 30 inches.
R048AY252CO	**Subalpine Clay** Subalpine Clay occurs on complex landslides, mountain slopes, dip slopes, and mesas. Slopes is between 0 to 35%. Soils are moderately deep to very deep (20 to 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.

Similar sites

R048AY222CO	**Loamy Park** Loamy Park occurs on alluvial and colluvial fans, hillsides, plains, sideslopes, terraces, valley sideslopes, and valley bottoms Slopes are from 0 to 30%. Soils are moderately deep to deep (20-60 inches) loamy soils derived from residuum from igneous and metamorphic rocks; alluvium from granite, gneiss, schist, or sandstone and shale. Soil surface texture are sandy loam to loam with loam subsurface. It is a Arizona Fescue – Mountain Muhly community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY228CO	**Mountain Loam** 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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata var. vaseyana*
Herbaceous	(1) *Festuca thurberi*

Physiographic features

Subalpine loam sites are often positioned on mountain side slopes and hills with rolling topography near or just below the spruce-fir-aspen zone. Often, aspen may be present or surround the up-slope boundary of the site. Generally slopes are between 1 and 15 percent, but can go as high as 30 percent.

The lower elevation at which this site occurs varies according to latitude as well as the amount of precipitation in the area.
Subalpine loams can be found at 8000 to 10,000 feet. The upper elevation is usually dictated by where true fir-

spruce-aspen forests begin.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Hill (3) Mountain (4) Mountainside
Flooding frequency	None
Ponding frequency	None
Elevation	8,000–10,000 ft
Slope	1–15%
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. Night time temperatures can be close to freezing even during the summer. Winter temperatures can reach well below 0°F even during the day. 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.

Soil moisture from snow melt carries over until summer rains begin allowing for virtually unrestricted plant growth by water availability. Some plants actually start growth while still covered by snow but the major site green-up often occurs in late May with the first snow often falling in late September to mid-October. The forbs on the sites take advantage of the early precipitation mostly flowering in late June and early July. This site is impacted by the short growing season. Most grasses will continue growth throughout the season and the shrubs, mainly mountain big sagebrush, takes advantage of the late season fall moisture for growth and/or seed production. The subalpine loam site is classified under the cryic temperature regime.

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

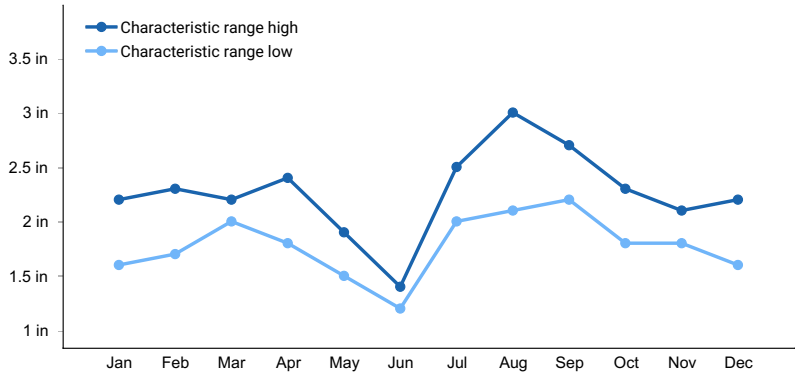


Figure 1. Monthly precipitation range

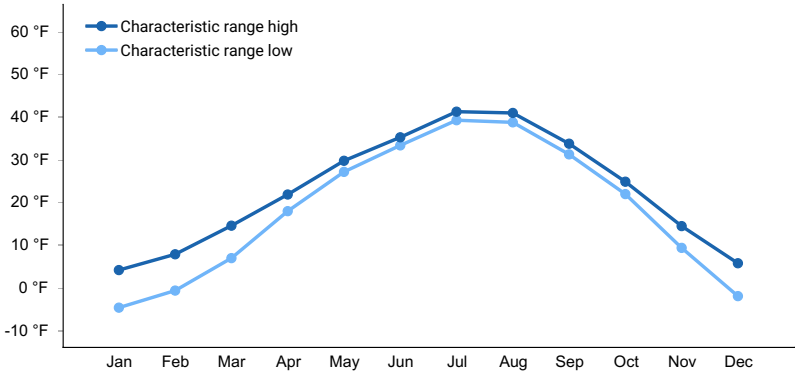


Figure 2. Monthly minimum temperature range

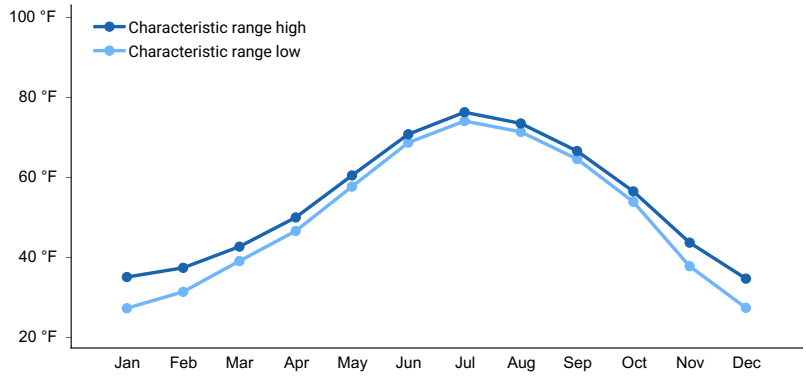


Figure 3. Monthly maximum temperature range

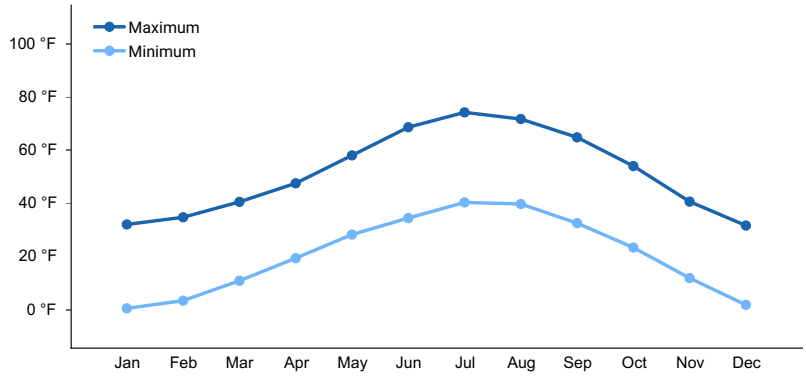


Figure 4. Monthly average minimum and maximum temperature

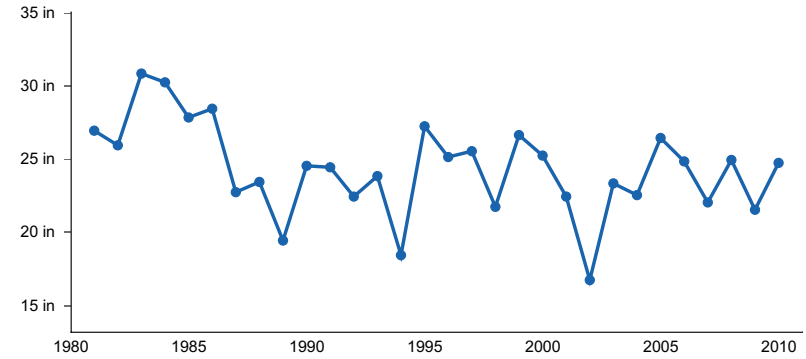


Figure 5. Annual precipitation pattern

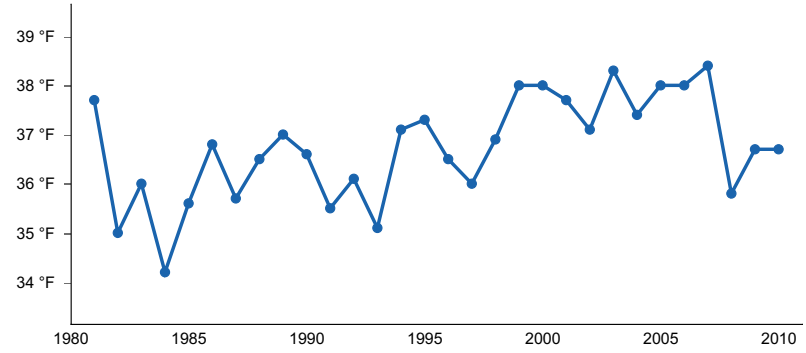


Figure 6. Annual average temperature pattern

Climate stations used

- (1) VAIL [USC00058575], Vail, CO
- (2) CRESTED BUTTE [USC00051959], Crested Butte, CO
- (3) MARVINE RCH [USC00055414], Meeker, CO

- (4) TELLURIDE 4WNW [USC00058204], Telluride, CO
- (5) SILVERTON [USC00057656], Silverton, CO
- (6) RICO [USC00057017], Cahone, CO
- (7) RIO GRANDE RSVR [USC00057050], Lake City, CO
- (8) CLIMAX [USC00051660], Leadville, CO

Influencing water features

There are no water features associated with this site.

Soil features

Soils of this site are loams or silt loams ranging to light clay loams. These soils have a thick dark surface layer greater than 16 inches (pachic) and are well developed, with clay accumulation increasing with depth (argillic) in the profile. Soils are deep or very deep to bedrock.

Water infiltration is high. If lime is present in the profile, it is deep. Soil moisture almost never limits plant growth and these soils are very conducive to plant growth.

As degradation and soil loss occurs, the mollic epipedon, may erode to an ochric epipedon and the soil order classification would change from a mollisol to an alfisol . More typically on eroded sites, the mollic epipedon may thin to less than 16 inches in thickness. On these eroded sites, pedestalling is usually apparent under the stable plant canopies.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–sandstone and shale (2) Colluvium–sandstone and shale (3) Residuum–clayey shale (4) Alluvium–shale (5) Complex landslide deposits–shale (6) Residuum–shale (7) Colluvium–volcanic rock (8) Alluvium–volcanic rock (9) Complex landslide deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	40–100 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (Depth not specified)	4.3–7.3 in
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Soil reaction (1:1 water) (Depth not specified)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

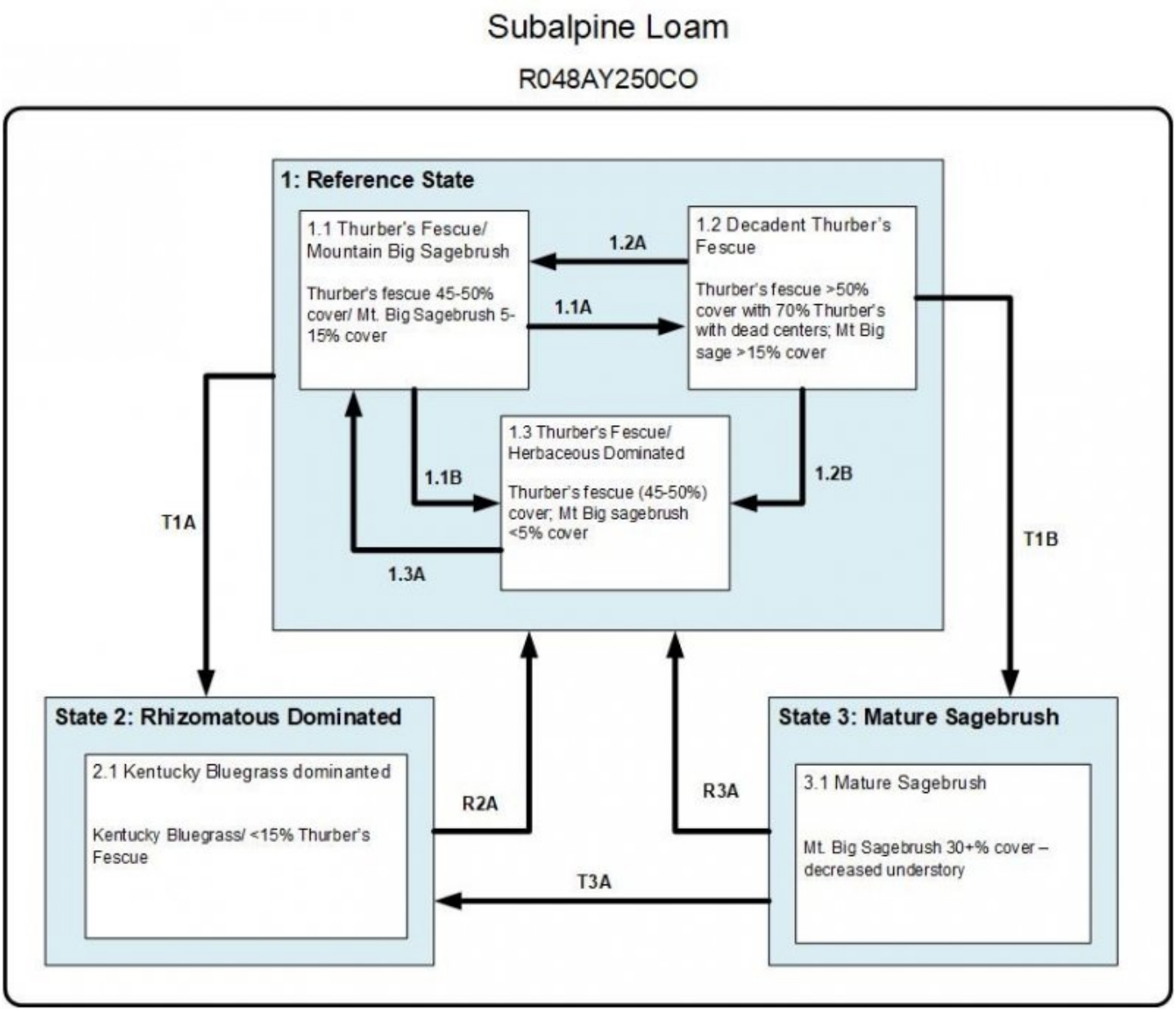
This site includes mountain peaks and other open grassland in the spruce-fir-aspen zone.

The production is predominantly made up of grasses; however, shrubs are a predominant part of the plant community. forbs, though not a high percentage, are always present in good numbers.

The dominant grasses are Thurber fescue and Parry oatgrass. Other abundant grasses are mountain brome, nodding brome, Columbia needlegrass, slender wheatgrass, and western wheatgrass. Less abundant grasses are Arizona fescue, Idaho fescue, sheep fescue, big bluegrass, mountain and nodding brome, mountain muhly, and spike trisetum. Forbs that make up the plant community are American vetch, aspen peavine, northwest cinquefoil, Nuttall larkspur, and Richardson geranium. Shrubs that occur on this site are mountain big sage, mountain snowberry, and fringed sage.

If ecological retrogression is cattle induced, desirable grasses will decrease. However, if retrogression is sheep induced, desirable forbs and shrubs may be reduced. Deterioration caused by overgrazing of cattle will decrease the percentage of grasses such as Arizona and Idaho fescue, mountain and nodding brome, mountain muhly, oniongrass, Parry oatgrass, slender wheatgrass, and spike trisetum. With the decrease of above-mentioned plants, mountain big sage, mountain snowberry, and many forbs will increase initially. Plants likely to occupy this site in poor range condition are tall rabbitbrush, low rabbitbrush, Douglas Knotweed, wyethia, tarweed, hounds tongue, and Colorado rubberweed.

State and transition model



State 1
Reference State

Community 1.1
Reference State

The plant community is about 65% grasses, 15% forbs, and 20% shrubs, air-dry weight. Basal area (the area of ground surface covered by perennial vegetation measured one inch above the soil) is approximately 50% when near the potential plant community. Total Annual Production Favorable years 3500 lbs/ac Normal years 2800 lbs/ac Unfavorable Years 2000 lbs/ac Out of this production 25-30% 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	1400	1500	1800
Forb	200	500	600
Shrub/Vine	400	500	600
Total	**2000**	**2500**	**3000**

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	**Grass and Grass-like**			1400–1800	
	Thurber's fescue	FETH	*Festuca thurberi*	560–1170	–
	western wheatgrass	PASM	*Pascopyrum smithii*	140–450	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	140–360	–
	Arizona fescue	FEAR2	*Festuca arizonica*	70–210	–
	Idaho fescue	FEID	*Festuca idahoensis*	70–210	–
	nodding brome	BRAN	*Bromus anomalus*	70–210	–
	mountain brome	BRMA4	*Bromus marginatus*	70–210	–
	elk sedge	CAGA3	*Carex garberi*	70–180	–

	Parry's oatgrass	DAPA2	*Danthonia parryi*	70–180	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	70–180	–
	Columbia needlegrass	ACNE9	*Achnatherum nelsonii*	0–180	–
	mountain muhly	MUMO	*Muhlenbergia montana*	0–180	–
	muttongrass	POFE	*Poa fendleriana*	70–180	–
	Sandberg bluegrass	POSE	*Poa secunda*	70–180	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–140	–
	oniongrass	MEBU	*Melica bulbosa*	0–90	–
	squirreltail	ELEL5	*Elymus elymoides*	0–90	–
	spike trisetum	TRSP2	*Trisetum spicatum*	0–90	–
Forb					
2	**Forbs**			200–600	
	Richardson's geranium	GERI	*Geranium richardsonii*	100–450	–
	Nevada pea	LALAL3	*Lathyrus lanszwertii var. leucanthus*	100–450	–
	silvery lupine	LUAR3	*Lupinus argenteus*	100–450	–
	American vetch	VIAM	*Vicia americana*	50–400	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	100–300	–
	western Indian paintbrush	CAOC4	*Castilleja occidentalis*	0–150	–
	bluebell bellflower	CARO2	*Campanula rotundifolia*	0–150	–
	hairy clematis	CLHI	*Clematis hirsutissima*	0–150	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	0–150	–
	twolobe larkspur	DENU2	*Delphinium nuttallianum*	0–150	–
	aspen fleabane	ERSP4	*Erigeron speciosus*	0–150	–
	flowery phlox	PHMU3	*Phlox multiflora*	0–150	–
	ragwort	SENEC	*Senecio*	0–150	–
	Fendler's meadow-rue	THFE	*Thalictrum fendleri*	0–90	–
	sulphur-flower buckwheat	ERUM	*Eriogonum umbellatum*	0–90	–
	lanceleaf springbeauty	CLLA2	*Claytonia lanceolata*	0–90	–
	Gunnison's mariposa lily	CAGU	*Calochortus gunnisonii*	0–90	–
	Rocky Mountain penstemon	PEST2	*Penstemon strictus*	0–90	–
	owl's-claws	HYHO	*Hymenoxys hoopesii*	0–90	–
	Rocky Mountain iris	IRMI	*Iris missouriensis*	0–90	–
	littleflower alumroot	HEPA10	*Heuchera parviflora*	0–60	–
	alpine false springparsley	PSMO	*Pseudocymopterus montanus*	0–60	–
Shrub/Vine					
3	**Shrubs**			400–600	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	200–600	–
	mountain snowberry	SYOR2	*Symphoricarpos oreophilus*	140–450	–
	big sagebrush	ARTRS2	*Artemisia tridentata ssp. spiciformis*	0–150	–
	silver sagebrush	ARCA13	*Artemisia cana*	0–150	–
	manzanita	ARCTO3	*Arctostaphylos*	0–90	–

	prairie sagewort	ARFR4	*Artemisia frigida*	0–90	–
	creeping barberry	MARE11	*Mahonia repens*	0–90	–
	Woods' rose	ROWO	*Rosa woodsii*	0–60	–

Animal community

Proper grazing by both wild and domestic animals on subalpine loam sites is imperative to promote needed nutrient cycling in a nutrient limited environment. Without proper grazing in these systems, nutrients remain stored in above ground biomass and thus are unavailable to plants and microorganisms. Removal or drastic reduction of grazing from these systems reduces the stored organic matter in the soil that is ever so important in creating the high water storage capacity necessary for these systems to function properly. Often wild grazers are the most responsible for improper grazing and site degradation. Improper grazing can be defined as continuous summer-long grazing, even with low animal densities.

This ecological site is extremely valuable for mule deer and elk during fawning and calving as well as throughout the rest of the year. This it provides habitat for a variety of other wildlife including sage-grouse, rabbits, chipmunks, badgers and occasionally black bear, porcupine, blue grouse, and gray jay. Since this ecological site is in close proximity to aspen, spruce, and/or fir trees, it may provide some habitat requirements for warbling vireo, grayheaded junco, Coopers hawk, sharpshinned hawk, and tree swallow.

Hydrological functions

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

Recreational uses

This site is a high quality area for recreation and natural beauty. Cool temperatures during the summer make the site attractive for summer picnics, fishing trips, and camping trips. Wild flowers are prolific and add to the landscape beauty. Hunting is another extensive use of the site.

Wood products

There are no potential wood production on this site.

Other information

ENDANGERED PLANTS AND ANIMALS:
There is a remote possibility that grizzly bears are associated with the site in remote areas of the San Juan Mountains. The same may be true for wolverines in some parts of the state.

Counties where this range site occurs are Alamosa, Archuleta, Boulder, Chaffee, Clear Creek, Conejos, Costilla, Custer, Delta, Delores, Douglas, Eagle, El Paso, Freemont, Garfield, Gilpin, Grand, Gunnison, Hinsdale, Huerfano, Jackson, Jefferson, Lake, La Plata, Larimer, Las Animas, Mesa, Mineral, Moffat, Montezuma, Montrose, Ouray, Park, Pitkin, Pueblo, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Summit, and Teller.

MAJOR POISONOUS PLANTS TO LIVESTOCK1/
Nuttall larkspur can be poisonous to cattle, horses, and rarely sheep. The type of poisoning is cumulative and can be poisonous in spring and early summer.

Orange sneezeweed is poisonous mainly in sheep but can be cattle and maybe horses. The type of poisoning is cumulative in all growth stages.

Rocky Mountain Iris can be poisonous to all livestock. The type of poisoning is acute and is poisonous in all

seasons when other forage is scarce.

Silvery lupine can be poisonous to all livestock. The type of poisoning is acute and is poisonous in the seed stage.

1/ For additional information regarding poisoning by specific plants, see Colorado Range Technical Notes.

Type locality

Location 1: Dolores County, CO	
General legal description	Open parks above Groundhog Reservoir and on South Mountain and Belmear Mountain north of Dolores in Dolores County, CO.
Location 2: Rio Blanco County, CO	
Township/Range/Section	TT3S RR93W S15
General legal description	SE ¼ of NE ¼, Sec 15, T3S, R93W, Rio Blanco County, CO.
Location 3: Eagle County, CO	
Township/Range/Section	TT4S RR84W SSec 3
General legal description	Sec 3, T4S, R84W, Eagle County, CO.
Location 4: Mesa County, CO	
Township/Range/Section	TT10S RR93W S36
General legal description	Sec 36, T10S, R93W, Mesa County, CO.
Location 5: Grand County, CO	
Township/Range/Section	TT1N RR81W SSec 9
General legal description	Sec 9, T1N, R81W, Grand County, CO.
Location 6: Jackson County, CO	
Township/Range/Section	TT7N RR77W S24
General legal description	Sec 24, T7N, R77W, Jackson County, CO.
Location 7: Moffat County, CO	
Township/Range/Section	TT1S RR84W SSec 6
General legal description	Sec 6, T1S, R84W, Moffat County, CO.

Other references

Chapman, S.S., G.E. Griffith, J.M. Omernik, A.B. Price, J. Freeouf, and D.L. Schrupp. 2006. Ecoregions of Colorado. (2 sided color poster with map, descriptive text, summary tables, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:1,200,000.

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored.

Soil Conservation Service (SCS). October 1987. Range Site Description for Subalpine Loam #235. : USDA, Denver Colorado

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

Western Regional Climate Center. Retrieved from http://www.wrcc.dri.edu/summary/Climsmco.html on Decenber 10, 2018

Contributors

Suzanne Mayne-Kinney

Approval

Kirt Walstad, 3/05/2024

Acknowledgments

Project Staff:
Suzanne Mayne-Kinney, Ecological Site Specialist, NRCS MLRA, Grand Junction SSO
Chuck Peacock, MLRA Soil Survey Leader, NRCS MLRA Grand Junction SSO

Program Support:
Rachel Murph, NRCS CO State Rangeland Management Specialist, Denver
Scott Woodhall, NRCS MLRA Ecological Site Specialist-QA Phoenix, AZ
Eva Muller, Regional Director, Rocky Mountain Regional Soil Survey Office, Bozeman, MT
B.J. Shoup, CO State Soil Scientist, Denver
Eugene Backhaus, CO State Resource Conservationist, Denver

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.

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	04/20/2024
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:**
