

Ecological site R048AY222CO

Loamy Park

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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

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.

Associated sites

R048AY237CO	Stony Loam Stony Loam occurs mainly alluvial fans, mountain slopes mountains and valley sides. Slopes is between 0 to 30%. Soils are deep (60 inches or more) loamy soils derived from outwash; till; colluvium from basalt, sandstone or granite and gneiss; and/or alluvium from igneous and metamorphic rocks; or basalt. Soil surface texture are stony to extremely stony loam, cobbly loam; or cobbly to very cobbly sandy loam with loamy-skeletal subsurface. It is a Mountain Big Sagebrush - Bluebunch wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY240CO	Shallow Pine Shallow Pine occurs on mountains and mountainsides. Slopes are 5 to 50%. Soils are shallow (10 to 20 inches). Soils are derived from slope alluvium from volcanic breccia, gneiss, granite, or sandstone and/or residuum from granite, granodiorite and/or gneiss. Soil surface texture is a gravelly to very gravelly sandy loam or very gravelly loam with loamy-skeletal subsurface. It is a Ponderosa Pine - Arizona Fescue – Mountain Muhly community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY238CO	Brushy Loam 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.
R048AY218CO	Dry Shallow Pine Shallow Pine occurs on mountains, hills, and mountainside. Slopes is between 5 to 35%. Soils are shallow (10 to 20 inches) in depth. Soils are derived from slope alluvium from monzonite or gneiss or from residuum from granite, gneiss or granodiorite. Soil surface texture is very gravelly sandy loam with a loamy skeletal subsurface. It is a Gambel's oak – Mountain muhly community. It has an 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.
R048AY229CO	Rocky Loam Rocky Loam occurs on ridges, mountainside, mountain slopes and mountains. Soils are very shallow to shallow (less than 20 inches) loamy-skeletal soils derived from residuum from granite, gneiss, phyllite, schist, sandstone and/or limestone. Soil surface texture are generally coarse sandy loams to light clay loams. 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.
R048AY230CO	Shallow Loam Shallow Loam occurs on mountains, and hills. Soils are very shallow to shallow (less than 20 inches) loamy-skeletal soils derived from slope alluvium from trachyte, volcanic breccia, gneiss, granite and/or sandstone; residuum from weathered volcanic breccia, tuff, igneous rock, sandstone or sandstone and shale. Soils surface textures are gravelly to very gravelly loam, gravelly to very gravelly sandy loam, cobbly loam. Or very cobbly sandy loam. It is an Arizona Fescue-Mountain Muhly community with scattered mountain mahogany, snowberry and current. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

Similar sites

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.
R048AY250CO	Subalpine Loam 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.
R048AY292CO	Deep Loam Deep Loam occurs alluvial fans, terraces, hills, fan remnants, valley sides, and structural benches. Slopes is between 0 to 25%. Soils are deep (60+ inches) in depth. Soils are derived from alluvium from basalt, or sandstone and shale; colluvium from sandstone and shale; slope alluvium from sandstone and shale or eolian deposits from sandstone and shale. Soil surface texture is loam, sandy clay loam or very channery loam, with a fine-loamy subsurface. It is a mountain big sagebrush – needle-and-thread community. It has an aridic ustic moisture regime and a frigid temperature regime. The effective precipitation ranges from 12 to 16 inches.
R048AY303CO	Loamy Slopes 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
Shrub	Not specified
Herbaceous	(1) <i>Festuca arizonica</i> (2) <i>Muhlenbergia montana</i>

Physiographic features

This site occurs on alluvial and colluvial fans, hillsides, plains, sideslopes, terraces, valley sideslopes, and valley bottoms Slopes are from 0 to 30 percent. Elevation ranges from 6500 to 8700 feet. Elevation limits depend to some extent on exposure but principally on storm patterns and air movement.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Valley side (3) Mountain slope (4) Valley (5) Structural bench
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None

Elevation	1,981–2,652 m
Slope	0–30%
Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation is about 16 to 20 inches. Of this, approximately 45-55% falls as snow, and 45-55% falls as rain between middle of May to and the end of September. Summer moisture is mostly from thundershowers in July, August and September. December to February is the driest period of the year with the driest month being January. July thru September is the wettest period and the wettest month is usually August. The average annual total snowfall is 84.9 inches. The snow depth usually ranges from 1 to 5 inches during November thru March. The highest winter snowfall record in this area is 127 inches which occurred in 2007-2008. The lowest snowfall record is 46.5 inches during the 2017-2018 winter. The frost-free period typically ranges from 80 to 120 days. The last spring frost is typically the middle of June to the end of June. The first fall frost is usually the end of August to the middle of September. 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 is 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.

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

Table 3. Representative climatic features

Frost-free period (characteristic range)	23-78 days
Freeze-free period (characteristic range)	75-111 days
Precipitation total (characteristic range)	432-457 mm
Frost-free period (actual range)	5-101 days
Freeze-free period (actual range)	43-134 days

Precipitation total (actual range)	432-483 mm
Frost-free period (average)	54 days
Freeze-free period (average)	92 days
Precipitation total (average)	457 mm

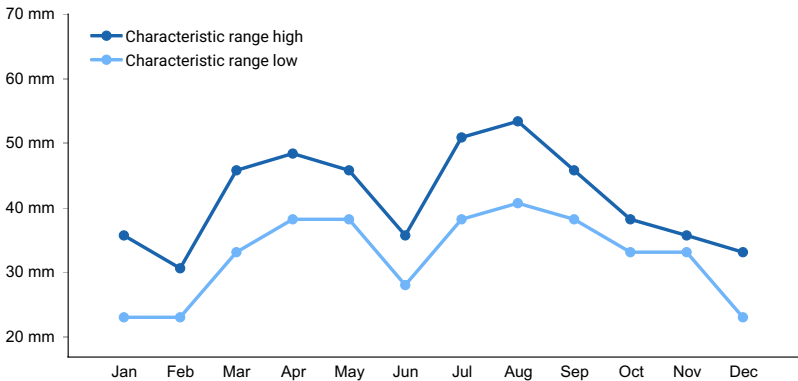


Figure 1. Monthly precipitation range

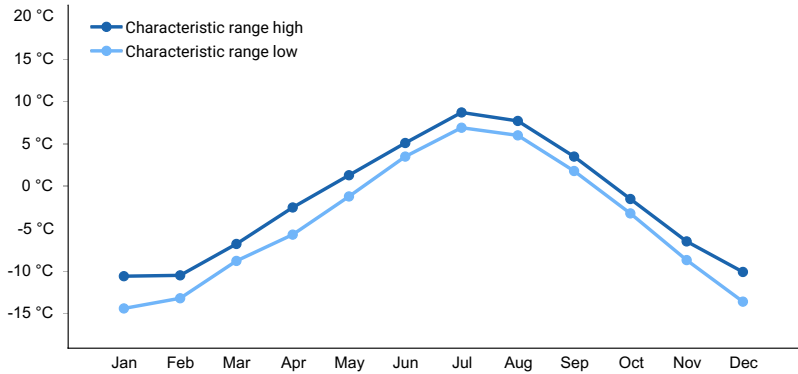


Figure 2. Monthly minimum temperature range

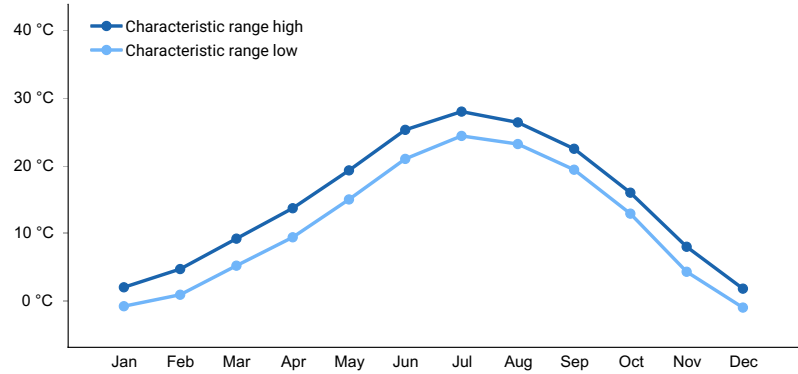


Figure 3. Monthly maximum temperature range

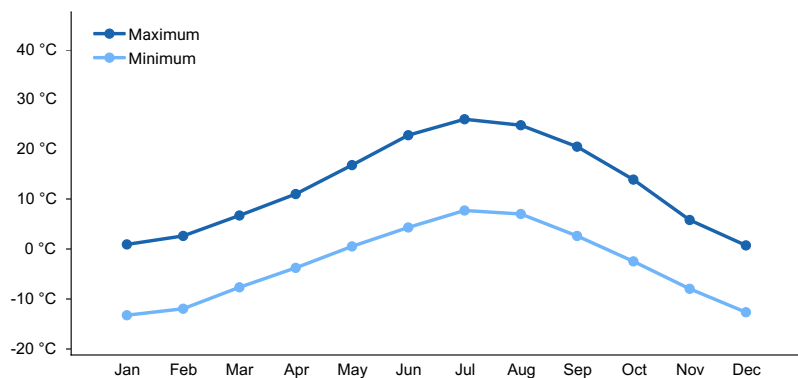


Figure 4. Monthly average minimum and maximum temperature

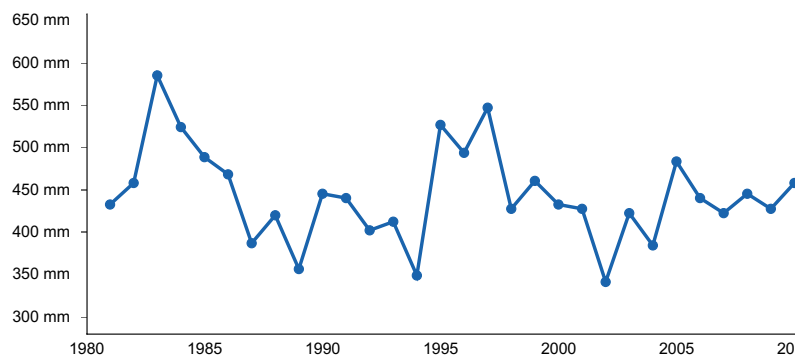


Figure 5. Annual precipitation pattern

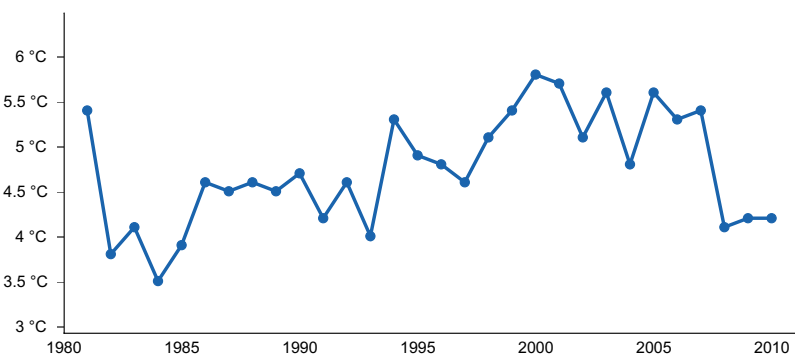


Figure 6. Annual average temperature pattern

Climate stations used

- (1) GLENWOOD SPGS #2 [USC00053359], Glenwood Springs, CO
- (2) RIDGWAY [USC00057020], Ridgway, CO
- (3) YAMPA [USC00059265], Toponas, CO
- (4) FRASER [USC00053116], Fraser, CO
- (5) GEORGETOWN [USC00053261], Idaho Springs, CO
- (6) HOURGLASS RSVR [USC00054135], Bellvue, CO
- (7) ASPEN PITKIN CO AP [USW00093073], Aspen, CO

Influencing water features

None

Soil features

The soils in this site are moderately deep to deep and well drained. The underlying layers are coarse to fine textured and some contain gravel and cobbles. Roots penetrate the soil readily down to bedrock.

These soils are on alluvial and colluvial fans, hillsides, plains, sideslopes, terraces, valley filling sideslopes, and upland drainageways and depressions. They are formed from colluvium, alluvium, reworked alluvium, residual, and conglomerate glacial outwash. Intake rates vary from moderately rapid to slow but are mostly moderate. These soils have a moderate to low available water capacity.

The soils have slight to moderate surface runoff and the erosion hazard is slight to moderate.

Major soils associated with this site are:

Farnuf loam 2-15%
 Gelkie sandy loam 1-10%
 Hesperus loam
 Moen loam 5-30
 Trag sandy loam 5-10%
 Westcreek gravelly loam 10-30%
 Youga loam

Table 4. Representative soil features

Parent material	(1) Alluvium–granite (2) Alluvium–granite and gneiss (3) Alluvium–schist (4) Residuum–granite (5) Alluvium–sandstone and shale (6) Slope alluvium–sandstone and shale (7) Residuum–igneous and metamorphic rock (8) Alluvium–igneous and metamorphic rock
Surface texture	(1) Loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	51–152 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–5%
Available water capacity (Depth not specified)	8.13–18.29 cm
Calcium carbonate equivalent (Depth not specified)	0–3%
Soil reaction (1:1 water) (Depth not specified)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–25%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The native plant community is about 80 percent (air-dry weight) grasses, 10 to 15 percent forbs, and 3 to 5 percent shrubs. Three major bunchgrasses dominate the plant community: Arizona fescue, mountain muhly, and Parry oatgrass. These three comprise 75 percent of the total annual production of the site. Grasses making up lesser percentages are western wheatgrass, slender wheatgrass, bearded wheatgrass, prairie Junegrass, needleandthread, Columbia needlegrass, Letterman needlegrass, and nodding brome. Mountain big sagebrush is found mostly on the western slope of Colorado.

A small amount of other grasses, a variety of forbs, and a few shrubs comprise the rest of the annual production. Trees are normally absent from the native plant community. An occasional white fir, ponderosa pine, Engelmann spruce, subalpine fir, lodgepole pine, and aspen may invade the site from adjacent woodland.

If ecological retrogression is cattle induced, desirable grasses will decrease. However, if retrogression is sheep induced, desirable forbs and shrubs may be reduced. Deterioration of the site will decrease Parry oatgrass, mountain muhly, Arizona fescue, the wheatgrasses, and the bromes.

Deterioration of the site will initially increase western wheatgrass, prairie Junegrass, elk and sun sedge, Letterman needlegrass, and most of the forbs and shrubs but with continuous heavy grazing, even these grasses will disappear.

With severe depletion plant species likely to invade or increase on this site and become a part of the plant community are annual forbs, curlycup gumweed, sleepy grass, flannel mullein, cheatgrass, and gamble oak, slimstem muhly and blue grama. On the western slope mountain big sagebrush will increase.

Annual production

Favorable years 2000 lbs/ac 2268 kg/ha

Normal years 1500 lbs/ac 1701 kg/ha

Unfavorable years 800 lbs/ac 907 kg/ha

Of this production, 15 to 20 percent is likely to be unpalatable to grazing animals.

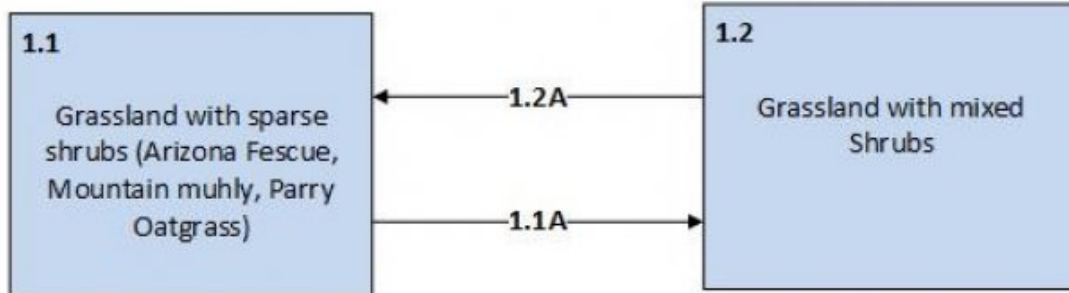
State and Transition Models are very basic and created for the Provisional Ecological Site Instruction.

State and transition model

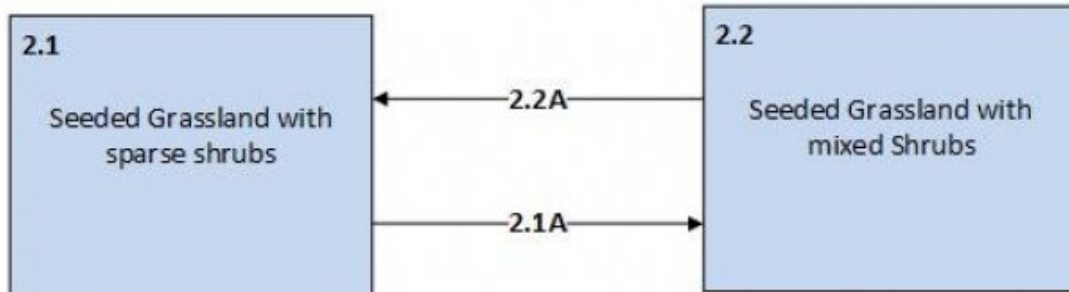
Loamy Park

R048AY222CO

1. Reference State



2. Seeded State



R2A

T1A

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 reestablished over extended time periods

State 1

Reference State

Community 1.1

Reference State

The native plant community is about 80 percent (air-dry weight) grasses, 10-15 percent forbs, and 3 to 5 percent shrubs.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	572	1255	1726
Forb	163	213	258
Shrub/Vine	163	213	258
Total	898	1681	2242

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	grasses			510–622	
	Parry's oatgrass	DAPA2	<i>Danthonia parryi</i>	420–588	–
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	420–588	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	420–588	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	84–168	–
	pine dropseed	BLTR	<i>Blepharoneuron tricholepis</i>	0–118	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	0–84	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–84	–
	nodding brome	BRAN	<i>Bromus anomalus</i>	34–84	–
	mountain brome	BRMA4	<i>Bromus marginatus</i>	17–84	–

	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	34–84	–
	slender wheatgrass	ELTRS	<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	0–84	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–67	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–67	–
	muttongrass	POFE	<i>Poa fendleriana</i>	0–50	–
	elk sedge	CAGA3	<i>Carex garberi</i>	0–34	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	0–34	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0–17	–
	slimstem muhly	MUFI	<i>Muhlenbergia filiculmis</i>	0–17	–

Forb

2	forbs			168–252	
	Drummond's milkvetch	ASDR3	<i>Astragalus drummondii</i>	17–34	–
	Missouri milkvetch	ASMI10	<i>Astragalus missouriensis</i>	17–34	–
	prairie thermopsis	THRH	<i>Thermopsis rhombifolia</i>	17–34	–
	American vetch	VIAM	<i>Vicia americana</i>	17–34	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	17–34	–
	Fremont's geranium	GECAF	<i>Geranium caespitosum</i> var. <i>fremontii</i>	17–34	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–17	–
	scarlet gilia	IPAG	<i>Ipomopsis aggregata</i>	0–17	–
	silvery lupine	LUAR3	<i>Lupinus argenteus</i>	0–17	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–17	–
	Torrey's penstemon	PEBAT	<i>Penstemon barbatus</i> ssp. <i>torreyi</i>	0–17	–
	sidebells penstemon	PESE11	<i>Penstemon secundiflorus</i>	0–17	–
	Rocky Mountain penstemon	PEST2	<i>Penstemon strictus</i>	0–17	–
	eastern pasqueflower	PUPA5	<i>Pulsatilla patens</i>	0–17	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	0–17	–
	trailing fleabane	ERFL	<i>Erigeron flagellaris</i>	0–17	–
	streamside fleabane	ERGLP	<i>Erigeron glabellus</i> var. <i>pubescens</i>	0–17	–
	redroot buckwheat	ERRA3	<i>Eriogonum racemosum</i>	0–17	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–17	–
	nodding onion	ALCE2	<i>Allium cernuum</i>	0–17	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–17	–
	Fendler's sandwort	ARFE3	<i>Arenaria fendleri</i>	0–17	–
	Lyall's rockcress	ARLY	<i>Arabis lyallii</i>	0–17	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	0–17	–

Shrub/Vine

3	shrubs			168–252	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	0–84	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	0–84	–
	Parry's rabbitbrush	ERPAH	<i>Ericameria parryi</i> var. <i>howardii</i>	17–50	–
	Woods' rose	ROWO	<i>Rosa woodsii</i>	17–50	–

	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	0–50	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	17–34	–
	wax currant	RICE	<i>Ribes cereum</i>	17–34	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	17–34	–
	Fendler's ceanothus	CEFE	<i>Ceanothus fendleri</i>	0–17	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–17	–
	green rabbitbrush	ERTE18	<i>Ericameria teretifolia</i>	0–17	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–17	–

Animal community

INTERPRETATIONS FOR GRAZING ANIMALS:

This site provides excellent spring and summer forage for cattle, horses, sheep, elk, deer, and small mammals.

The animal forage preference changes as the spring season progresses into summer, fall, and winter. All of the dominant grasses on this site are most desirable in the spring and early summer. Good management on this site necessitates that proper grazing use and planned deferment be followed so that these grasses are not grazed out and replaced by less desirable species.

Vegetation palatability will influence proper grazing use considerations. Relative palatability for each species will vary depending on the season of use, kind of grazing animal, past grazing use, and the associated plant species.

Guide to initial stocking rate

Cond % climax ac/AUM AUM/ac ha/AUM AUM/ha

Exc 76-100 1.79-2.37 .43-.56 .71 .93 1.07-1.4

Good 51-75 2.38-3.56 .29-.42 .94-1.4 .72-1.06

Fair 26-50 3.57-7.13 .15-.28 1.41-2.84 .36-.71

Poor 0-25 7.14+ -.14 2.85+ -.35

INTERPRETATIONS FOR WILDLIFE:

This site has a high potential for wildlife habitat because of the great variety and abundance of desirable grasses and forbs produced. This site provides habitat for elk, mule deer, nongame birds, coyote, and small mammals.

Hydrological functions

The soils in this site are grouped into “B” and “C” hydrologic groups, 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. The hydrologic curve numbers for group “B” and group “C” soils are 61 and 74 respectively, when hydrologic conditions are good, as shown in “Peak Flows in Colorado” handbook.

Refer to SCS National Engineering Handbook, Section 4, to determine runoff quantities from the curves.

Recreational uses

This site has many forbs and some shrubs that bloom from early spring to early summer, which are aesthetically pleasing. Hunting for mule deer and Elk is generally good to excellent on this site.

Wood products

No wood products are produced on this site.

Other information

THREATENED AND ENDANGERED PLANTS AND ANIMALS

Gaura neomexicana coloradoensis or Colorado Butterfly weed has been reported as endangered and has been reported in Douglas, Weld, and Larimer counties. However, its occurrence on this range site had not been proven.

POISONOUS PLANTS:

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.

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.

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, salivation, 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.

Pingue Hymenoxys (*Hymenoxys richardsonii*) is mainly poisonous to sheep but occasionally cattle. It is poisonous through the growing season. Hungry animals are very susceptible in the spring and fall. All above ground parts of pinque hymenoxys are poisonous. Grazing the plant may cause a gradual build up of the toxin to a lethal level, or if large amounts are eaten, poisoning may occur immediately. The first sign of poisoning is green froth around the nose and mouth from salivation and vomiting. Other signs are loss of appetite, weakness, and depression, irregular gait and trembling, followed by emaciation and death unless animals are removed from the area.

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.

Lupinus sericeus will cause crooked leg disease in calves during the 40th to 70th day of gestation and will cause other congenital deformities. The most characteristic symptom is labored breathing. Animals may vary from depression and coma to extreme activity. Animals may butt objects and other animals or may stand with lowered head pressing against a solid object. Death from respiratory paralysis follows a short period of convulsions.

Poisoning of cattle show dry nose, stilted walk, lethargy, depression, hard dry feces, rough dry hair, coat, quivering, extreme body weakness, irregular exaggerates these symptoms.

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.

Lambert crazyweed (*Oxytropis lambertii*) is poisonous to all animals in all season but especially spring. Poisoning is cumulative. Signs of poisoning appear after 2 to 3 weeks of continuous grazing. With acute poisoning in cows and ewes, abortion and congenital skeletal malformations frequently occur. Animals must eat large amounts for 2 to 5 weeks before death occurs. Constipation, incoordination of muscles and peculiar gait, crazed actions, loss of flesh, loss of sense of direction, and nervousness are the visible signs.

The site occurs in the Canon City, Castle Rock, Center, Colorado Springs, Cortez, Cripple Creek, Durango, Fort Collins, La Jara, Lakewood, Longmont, Monte Vista, Pagosa Springs, Pueblo, Salida, San Luis, Trinidad, Walsenburg, and Westcliffe field offices.

Type locality

Location 1: Chaffee County, CO	
General legal description	The open park east of highway 285 on Trout Creek Pass.

Other references

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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	05/12/2025
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:**
-