USDA Natural Resources Conservation Service

Ecological site R048AY240CO
Shallow Pine

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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

R048AY240CO Shallow Pine occurs on mountains and mountainsides. Slopes are 5 to 40%. 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.

Associated sites

R048AY222CO	**Loamy Park** R048AY222CO 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 an Arizona Fescue – Mountain Muhly community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY230CO	**Shallow Loam** R048AY230CO – Shallow Loam occurs on mountain, hills, ridges, mountain sides and mountain slopes. 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.
R048AY377CO	**Skeletal Loam** R048BY377CO Skeletal Loam occurs on hills, mountains, mountainsides, fan terraces, pediments, outwash terrace and mesas. Slopes is between 5 to 55%. Soils are deep to very deep (40 to 60+ inches). Soils are derived from slope alluvium from conglomerate, sandstone, trachyte, or volcanic breccia; outwash; colluvium from volcanic rock, trachyte, or volcanic breccia or residuum from volcanic rock. Soil surface texture is usually very gravelly loam. gravelly loam, very cobbly loam or very gravelly sandy loam with loamy-skeletal or clayey skeletal textured subsurface. It is an Arizona Fescue – Parry's Oatgrass community. It has an aridic ustic moisture regime. The effective precipitation ranges from 14 to 16 inches.

Similar sites

R048AY251CO	**Shallow Subalpine** R048AY251CO 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
R048AY230CO	**Shallow Loam** R048AY230CO – Shallow Loam occurs on mountain, hills, ridges, mountain sides and mountain slopes. 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.
R048AY218CO	**Dry Shallow Pine** R048AY218CO 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 a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.

R048AY307CO	**Shallow Slopes** R048AY307CO – Shallow Slopes occurs on hillsides, ridges, mountainside and canyon walls. Soils are shallow (less than 20 inches) loamy textured soils derived from residuum from sandstone and limestone. Soil surface textures are generally sandy loam or gravelly sandy loam. It is a Black sagebrush –western wheatgrass community. It has an aridic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 12 to 16 inches.

Table 1. Dominant plant species

Tree	(1) *Pinus ponderosa*
Shrub	Not specified
Herbaceous	(1) *Muhlenbergia montana* (2) *Festuca arizonica*

Physiographic features

This site is on moderately sloping to steep mountainous terrain. It occurs on shallow soils found on mountains and mountain-sides. Slopes range from 5 to 40 percent. Elevation ranges from 8000 to 10000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Mountainside
Runoff class	Very high
Flooding frequency	None
Ponding frequency	None
Elevation	2,438–3,048 m
Slope	5–40%
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 25.5ºF to 60.3ºF, averaging about 24ºF for the winter and 61.8ºF in the summer. Summer high temperatures of mid-70ºF to low 80ºF are not unusual. The coldest winter temperature recorded was -36ºF on February 2, 1985 and the warmest winter temperature recorded was 65ºF on December 5, 1995. The coldest summer temperature recorded was 19ºF on June 2, 1990 and the warmest was 98ºF 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.

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

Table 3. Representative climatic features

Frost-free period (characteristic range)	23-78 days
Freeze-free period (characteristic range)	75-111 days
Precipitation total (characteristic range)	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

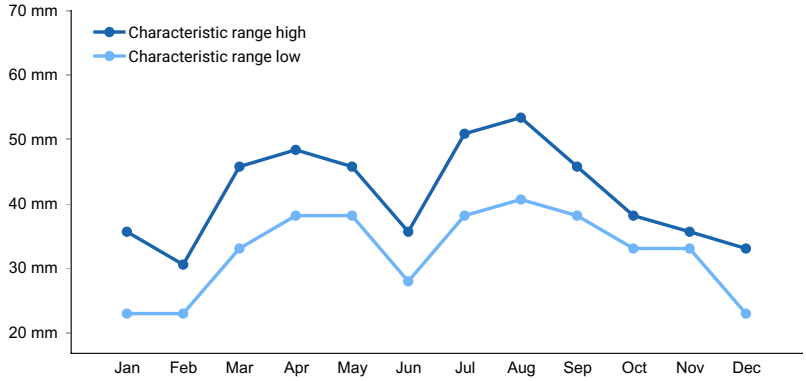


Figure 1. Monthly precipitation range

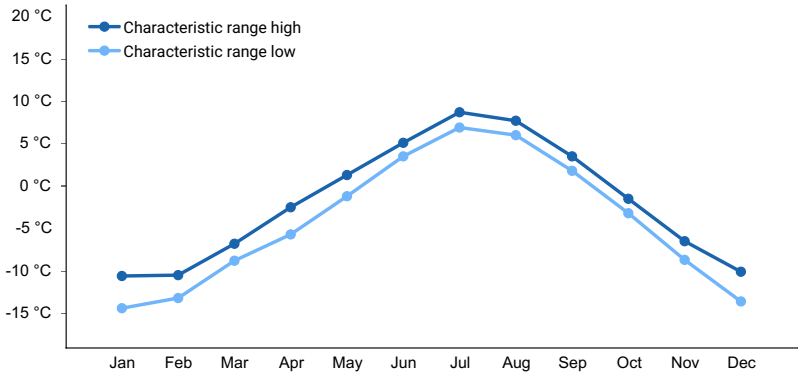


Figure 2. Monthly minimum temperature range

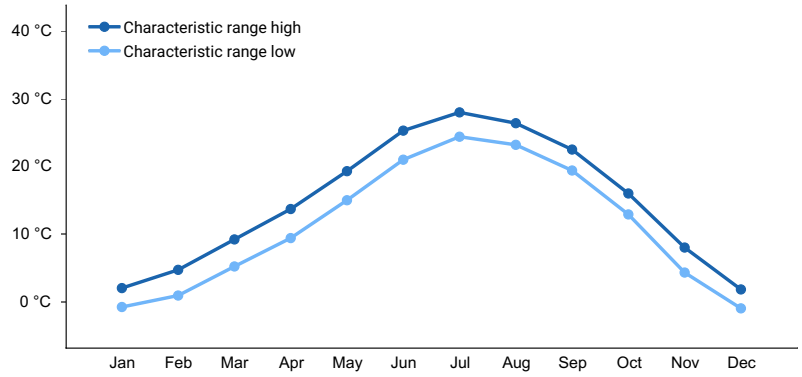


Figure 3. Monthly maximum temperature range

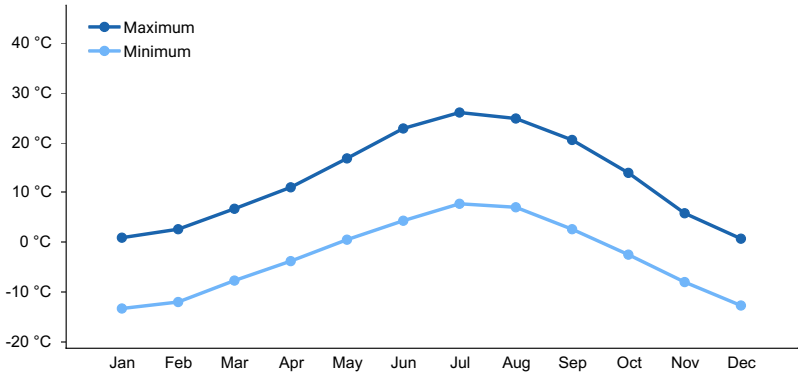


Figure 4. Monthly average minimum and maximum temperature

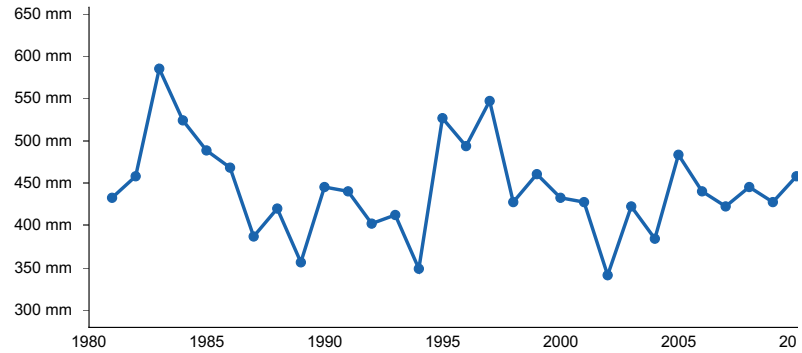


Figure 5. Annual precipitation pattern

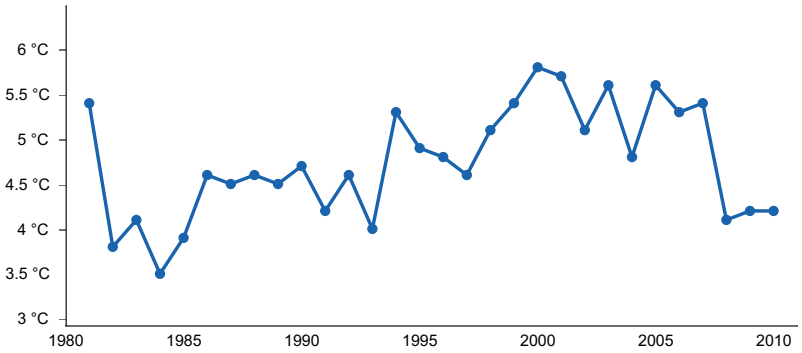


Figure 6. Annual average temperature pattern

Climate stations used

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

Influencing water features

None

Soil features

This site occurs on shallow and well drained soils that have formed on mountain and mountain-sides. Typically, the surface layer is very gravelly sandy loam.

Permeability is moderate to moderately rapid. Erosion hazard is slight to very high depending on the steepness of slopes. Rooting depth is about 8 to 20 inches, and available water capacity is very low.

Major soils associated with this site are:

Bushpark, Cathedral, Herbman, Raleigh, Rofork, and Rogert.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–volcanic breccia (2) Slope alluvium–granite and gneiss (3) Slope alluvium–sandstone (4) Residuum–granite and gneiss (5) Residuum–granodiorite
Surface texture	(1) Very gravelly, gravelly sandy loam (2) Very gravelly loam
Family particle size	(1) Loamy-skeletal
Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	20–51 cm
Surface fragment cover <=3"	15–45%
Surface fragment cover >3"	0–15%

Soil reaction (1:1 water) (Depth not specified)	6.1–7.8
Subsurface fragment volume <=3" (Depth not specified)	40–65%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

The plant community has an open stand ponderosa pine and mountain bunchgrass aspect. Some open park areas occur throughout the site. The plant community is about 75-80 percent grass and grass-like plants, 5-10 percent forbs, and 10-20 percent shrubs and trees by air dry weight.

Dominant grasses are mountain muhly, Arizona fescue, and Parry oatgrass. Less abundant grasses are prairie Junegrass and muttongrass. Forbs present in the plant community include Richardson geranium and rose pussytoes.

Shrubs that occur on this site are gamble oak, true mountain mahogany, and wax currant.

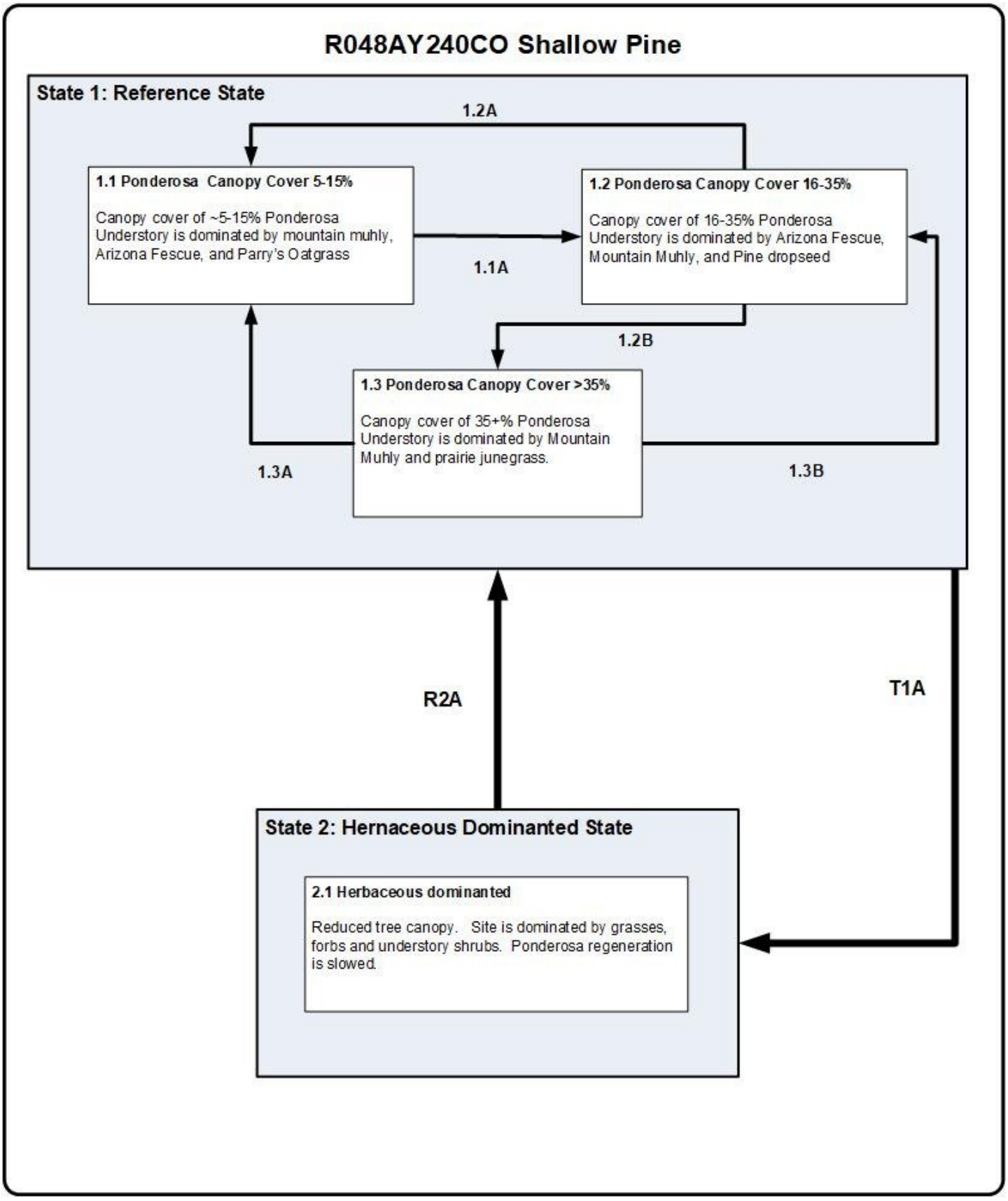
The dominant tree species is ponderosa pine. Occurring as minor but consistent components of the over story are Rocky Mountain juniper, pinyon pine, and limber pine at the lower elevations, and bristlecone pine at higher elevations.

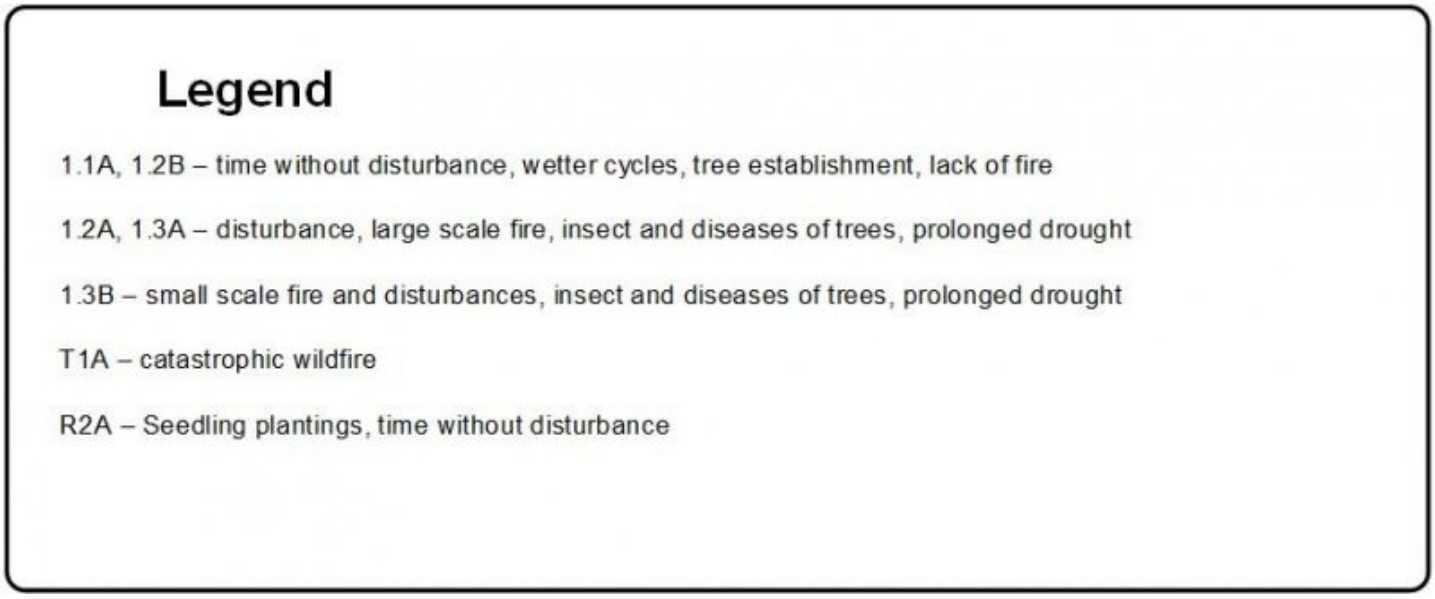
If ecological retrogression is cattle-induced, desirable grasses will decrease. However, is retrogression is sheep-induced, desirable forbs and shrubs may be reduced. Deterioration of this site caused by overgrazing of cattle will decrease the percentage of grasses such as Arizona fescue, Parry oatgrass and mountain muhly. With the decrease of above mentioned plants blue grama, bottlebrush squirreltail and prairie Junegrass will increase initially. Forbs will increase such as rose pussytoes and shrubs such as fringed sagebrush will also increase. Plant species likely to invade and increase in density will be sleepy grass, cheatgrass, red three-awn, broom snakeweed, curlycup gumweed and pingue hymenoxys.

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

State and transition model

R048AY240CO Shallow Pine





State 1
Reference State

Community 1.1
Reference State 0-15% canopy

Basal area (the area of ground surface covered by perennial vegetation measured one inch above the soil) is approximately 30 to 35% where the canopy cover is 0-15%. ANNUAL PRODUCTION: If the range is in excellent condition, the approximate total annual production (air-dry) is: Canopy Class 0-15% Favorable years 1450 Pounds/Ac Normal years 1200 Pounds/Ac Unfavorable years 800 Pounds/Ac Of this production 10-15% will likely be unpalatable or out of reach to grazing animals. Guide to initial stocking rate: 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/month air-dry forage per animal unit. To maintain proper use and allow for forage that disappears through trampling, small herbivore use, weathering, etc., 25 percent of the palatable forage produced is considered usable. Condition Percent Climax Class Vegetation AC/AUM AUM/AC Excellent 76-100 2.4-2.9 042-.34 Good 51-75 3.0-4.7 .33-.22 Fair 26-50 4.8-8.1 .21-.13 Poor 0-25 8.2+ .12- Adjustments to the initial stocking rates should be made as needed to obtain proper use. With specialized grazing systems, large livestock breeds, uncontrolled big game herbivores, inaccessibility, dormant season use, presence of introduced species, etc., stocking rate adjustments will be required. This guide to initial stocking is based upon the annual (air-dry) production when the site is in excellent condition class in normal years under the 0-15 percent canopy class. Downward adjustments in stocking rate must be made as the canopy class increase about 15 percent. Palatability: Vegetation palatability by animal class is based on the attractiveness of the plant to animals as forage. Grazing preference changes from time to time and place to place depending on the animal class, plant palatability and nutrient value, stage of growth and season of use.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	583	874	1059
Shrub/Vine	135	202	241
Tree	90	135	163
Forb	90	135	163
Total	**898**	**1346**	**1626**

Community 1.2
Reference State 16-35+% Canopy

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

approximately when canopy cover is 16-35%. ANNUAL PRODUCTION: If the range is in excellent condition, the approximate total annual production (air-dry) is: Canopy Class 16-35+% Favorable years 900 pounds/Ac Normal years 700 pounds/Ac Unfavorable years450 Pounds/Ac Of this production 10-15% will likely be unpalatable or out of reach to grazing animals.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Tree	–	–	–
Shrub/Vine	–	–	–
Grass/Grasslike	–	–	–
Forb	–	–	–
Total	**–**	**–**	**–**

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grasses**			729–1009	
	mountain muhly	MUMO	*Muhlenbergia montana*	336–538	–
	Parry's oatgrass	DAPA2	*Danthonia parryi*	135–269	–
	Arizona fescue	FEAR2	*Festuca arizonica*	135–269	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–67	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	11–67	–
	muttongrass	POFE	*Poa fendleriana*	28–56	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	11–39	–
	Geyer's sedge	CAGE2	*Carex geyeri*	11–39	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–39	–
	squirreltail	ELEL5	*Elymus elymoides*	0–28	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	0–11	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–11	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–11	–
	nodding brome	BRAN	*Bromus anomalus*	0–11	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–11	–
Forb					
2	**Forbs**			56–224	
	rosy pussytoes	ANRO2	*Antennaria rosea*	11–39	–
	Richardson's geranium	GERI	*Geranium richardsonii*	11–28	–
	Fendler's sandwort	ARFE3	*Arenaria fendleri*	11–28	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–28	–
	silvery lupine	LUAR3	*Lupinus argenteus*	0–28	–
	slender cinquefoil	POGR9	*Potentilla gracilis*	11–28	–
	common yarrow	ACMI2	*Achillea millefolium*	0–11	–
	Rocky Mountain penstemon	PEST2	*Penstemon strictus*	0–11	–
	bluebell bellflower	CARO2	*Campanula rotundifolia*	0–11	–

	winged buckwheat	ERAL4	*Eriogonum alatum*	0–11	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–11	–
	field sagewort	ARCAC	*Artemisia campestris ssp. caudata*	0–11	–
Shrub/Vine					
3	**Shrubs**			112–280	
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	11–40	–
	Gambel oak	QUGA	*Quercus gambelii*	0–39	–
	wax currant	RICE	*Ribes cereum*	11–28	–
	Parry's rabbitbrush	ERPAH	*Ericameria parryi var. howardii*	11–28	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–11	–
Tree					
4	**Trees**			56–224	
	ponderosa pine	PIPO	*Pinus ponderosa*	0–56	–
	bristlecone pine	PIAR	*Pinus aristata*	0–39	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–11	–
	limber pine	PIFL2	*Pinus flexilis*	0–11	–
	Douglas-fir	PSME	*Pseudotsuga menziesii*	0–11	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	0–11	–

Table 8. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Grass/Grass-like**			–	
	Arizona fescue	FEAR2	*Festuca arizonica*	157–235	–
	mountain muhly	MUMO	*Muhlenbergia montana*	118–196	–
	Parry's oatgrass	DAPA2	*Danthonia parryi*	0–78	–
	pine dropseed	BLTR	*Blepharoneuron tricholepis*	22–56	–
	Geyer's sedge	CAGE2	*Carex geyeri*	17–39	–
	squirreltail	ELEL5	*Elymus elymoides*	17–34	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–34	–
	nodding brome	BRAN	*Bromus anomalus*	0–22	–
	threadleaf sedge	CAFI	*Carex filifolia*	0–22	–
	Letterman's needlegrass	ACLE9	*Achnatherum lettermanii*	0–17	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–17	–
	muttongrass	POFE	*Poa fendleriana*	6–17	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–6	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	0–6	–
	blue grama	BOGR2	*Bouteloua gracilis*	0–6	–
Forb					
2	**Forb**			–	
	rosy pussytoes	ANRO2	*Antennaria rosea*	6–17	–
	Fendler's sandwort	ARFE3	*Arenaria fendleri*	0–6	–

	field sagewort	ARCAC	*Artemisia campestris ssp. caudata*	0–6	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–6	–
	bluebell bellflower	CARO2	*Campanula rotundifolia*	0–6	–
	winged buckwheat	ERAL4	*Eriogonum alatum*	0–6	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–6	–
	silvery lupine	LUAR3	*Lupinus argenteus*	0–6	–
	Rocky Mountain penstemon	PEST2	*Penstemon strictus*	0–6	–
	slender cinquefoil	POGR9	*Potentilla gracilis*	0–6	–
	common yarrow	ACMI2	*Achillea millefolium*	0–6	–
	Richardson's geranium	GERI	*Geranium richardsonii*	0–1	–
Shrub/Vine					
3	**Shrub**			–	
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	17–34	–
	Parry's rabbitbrush	ERPAH	*Ericameria parryi var. howardii*	6–22	–
	Gambel oak	QUGA	*Quercus gambelii*	0–22	–
	wax currant	RICE	*Ribes cereum*	6–22	–
	prairie sagewort	ARFR4	*Artemisia frigida*	0–8	–
Tree					
4	**Tree**			–	
	ponderosa pine	PIPO	*Pinus ponderosa*	34–62	–
	bristlecone pine	PIAR	*Pinus aristata*	22–45	–
	limber pine	PIFL2	*Pinus flexilis*	0–8	–
	twoneedle pinyon	PIED	*Pinus edulis*	0–8	–
	Douglas-fir	PSME	*Pseudotsuga menziesii*	0–8	–
	Rocky Mountain juniper	JUSC2	*Juniperus scopulorum*	0–8	–

Animal community

INTERPRETATIONS FOR LIVESTOCK GRAZING:
The site provides good to excellent spring and summer forage for cattle and horses, and good summer forage for sheep. Livestock access can be limited on the steeper slopes thereby reducing grazing values especially for certain kinds and age-classes of animals. Care should be exercised to avoid over-grazing on the steeper slopes due to the very high erosion hazard.

The animal forage preferences change as the growing season progresses. All of the dominant grasses on this site are most palatable in the late spring and summer season. Good management on this site necessitates that proper grazing use and a planned system of deferment be followed so that these dominant grasses are not grazed out and replaced by less desirable species. Summer deferment from June 1 through August 31 will benefit mountain muhly, Arizona fescue, and Parry oatgrass; while spring trough early summer deferment will benefit muttongrass and western wheatgrass.

INTERPRETATIONS FOR WILDLIFE:
Habitat value, when the site is in excellent condition, is high for elk, small mammals, and blue grouse, while value is medium for antelope and mule deer. As the ecological condition begins to deteriorate values for elk will decrease while values for all other species will not significantly change. Continue regression of the site will decrease habitat values for all species of wildlife. A decline to poor ecological condition will initiate severe erosion on steeper slopes and result in extremely low wildlife value for the site.

This range site provides habitats which support a resident animal community that is characterized by mule deer, antelope, small mammals including the black squirrel, cottontail, non-game birds, and blue grouse. There is seasonal use by elk.

Hydrological functions

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

Recreational uses

This site has many forbs and shrubs that bloom from spring to early summer which are aesthetically pleasing. The park-like aspect created by the scattered evergreen trees add to the aesthetics of the site and increase the recreational values associated with camping and hiking. Hunting for mule deer, elk, and antelope is generally good to excellent on this site.

Wood products

The site has a low-value potential for lumber. The potential for firewood cutting is higher on areas level enough to work. Christmas tree production is very limited due to the scattered nature of the trees and a severe seedling mortality problem. The erosion hazard is severe on slopes greater than 35%.

Ponderosa pine is the principal tree species present on the site. Other species include Douglas-fir which is present on north slopes, bristlecone pine above 9000 feet elevation and pinyon pine on the lower drier slopes. Site index for ponderosa pine is 45, the woodland class is 2D for areas up to 35% slope and 2R for steeper slopes. No site data is available for species other than ponderosa pine.

Other information

POISONOUS PLANTS:
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.

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.

Ponderosa pine can be poisonous to cattle. It causes abortion characterized by weak parturition contractions, weak calves, persistently retained placentas. This can happen when forage is scarce.

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

COUNTIES IN WHICH THE RANGE SITE OCCURS:
Fremont, Park, and Teller

Type locality

Location 1: Teller County, CO	
Township/Range/Section	TT15S RR70W S22

General legal description	Two miles south west of Cripple Creek, Teller County SW1/4 Sec 22, T15S, R70W
Location 2: Teller County, CO	
Township/Range/Section	TT13S RR71W S23
General legal description	Florisant Fossil Beds National Monument, Teller County SW1/4 Sec 23, T13S, R71W

Other references

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 Shallow Pine #240. : 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 December 10, 2018

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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	05/13/2025
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:**