

## **Ecological site R048AY257CO Clayey Valley**

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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**

R048AY257CO Clayey Valley occurs on hillslopes, and old high terraces. Slopes is between 1 to 12 percent. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from slope alluvium from shale or alluvium from sandstone and shale. Soil surface texture is loam or clay loam with fine textured subsurface. It is Western

wheatgrass – Arizona Fescue with scattered Ponderosa Pine. It has a Typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 16 to 20 inches.

### Associated sites

R048AY241CO	<b>Mountain Meadow</b> R048AY241CO Mountain Meadow occurs flood plains, stream terraces, drainageways, ephemeral streams, flood-plain step and depressions. This site has natural sub-irrigation. Slopes is between 0 to 12%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from alluvium from sandstone and shale, sedimentary rock, igneous, metamorphic and sedimentary rock, or shale. Soil surface texture is loam, silty clay loam, clay loam, clay, sandy clay loam or sandy loam with fine-loamy or fine textured subsurface. It has a typic aquic or oxyaquic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
F048AY925CO	<b>Ponderosa Pine Forest</b> F048AY925CO occurs on hillsides, mountain-slopes, mesas, structural benches and cuestras. Slopes are 3 to 30%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from slope alluvium from sandstone and/or shale, colluvium from sandstone and/or shale, or residuum from sandstone and shale. Soil surface texture is a loam, clay loam, sandy loam, fine sandy loam, very stony loam, cobbly sandy loam, or very boulder sandy loam with fine textured subsurface. It is a Ponderosa Pine - Muttongrass – squirreltail community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY248CO	<b>Mountain Clay Loam</b> R048AY248CO Mountain Clay Loam occurs on alluvial fans, mesas, hills, dip slopes, and mountain slopes. Slopes is between 1 to 40%. Soils are deep to very deep (40 to 60+ inches). Soils are derived from alluvium and slope alluvium from shale; or alluvium, slope alluvium, colluvium and/or residuum from sandstone and shale. Soil surface texture is loam, silty clay loam, gravelly loam or a clay loam with fine-textured subsurface. It is Arizona Fescue – western wheatgrass – Gambel's Oak community. It has a typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 16 to 20 inches.
R048AY228CO	<b>Mountain Loam</b> R048AY228CO 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.

### Similar sites

F048AY925CO	<b>Ponderosa Pine Forest</b> F048AY925CO occurs on hillsides, mountain-slopes, mesas, structural benches and cuestras. Slopes are 3 to 30%. Soils are moderately deep to very deep (20 to 60+ inches). Soils are derived from slope alluvium from sandstone and/or shale, colluvium from sandstone and/or shale, or residuum from sandstone and shale. Soil surface texture is a loam, clay loam, sandy loam, fine sandy loam, very stony loam, cobbly sandy loam, or very boulder sandy loam with fine textured subsurface. It is a Ponderosa Pine - Muttongrass – squirreltail community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY240CO	<b>Shallow Pine</b> 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.

R048AY248CO	<b>Mountain Clay Loam</b> R048AY248CO Mountain Clay Loam occurs on alluvial fans, mesas, hills, dip slopes, and mountain slopes. Slopes is between 1 to 40%. Soils are deep to very deep (40 to 60+ inches). Soils are derived from alluvium and slope alluvium from shale; or alluvium, slope alluvium, colluvium and/or residuum from sandstone and shale. Soil surface texture is loam, silty clay loam, gravelly loam or a clay loam with fine-textured subsurface. It is Arizona Fescue – western wheatgrass – Gambel's Oak community. It has a typic ustic moisture regime and frigid temperature regime. The effective precipitation ranges from 16 to 20 inches.
R048AY255CO	<b>Pine Grasslands</b> R048AY255CO Pine Grassland occurs on structural benches, dip slopes, hills, mesas and canyon benches. Slopes is between 0 to 30%. This site has more than one soil concept correlated to it. The concepts are shallow soils (<20
R048AY247CO	<b>Deep Clay Loam</b> R048AY247CO Deep Clay Loam occurs on hills, hillsides, mountain-slope, complex landslides, alluvial fans, and structural benches. Slopes is between 0 to 35%. Soils are deep (60+ inches). Soils are derived from colluvium and slide deposits from igneous, metamorphic and sedimentary rocks, and/or alluvium, residuum or complex landslide deposits from shale. Soil surface texture is loam, clay loam or silty clay loam with fine-textured subsurface. It is a mountain big sagebrush – western wheatgrass community. It has a typic ustic moisture regime. The effective precipitation ranges from 16 to 20 inches.
R048AY252CO	<b>Subalpine Clay</b> R048AY252CO Subalpine Clay occurs on complex landslides, mountain slopes, mountainsides, and dip slopes. Slopes is between 0 to 40%. Soils are moderately deep to very deep (39to 60+ inches). Soils are derived from complex landslide deposits from igneous, metamorphic and sedimentary rock; colluvium from shale; colluvium and/or slide deposits over residuum weathered from igneous and sedimentary rock. Soil surface texture is loam, clay loam or silt loam with fine-textured subsurface. It is Thurber's Fescue – western wheatgrass – mountain snowberry. It has an ustic udic/typic udic moisture regime and cryic temperature regime. The effective precipitation ranges from 20 to 30 inches.

**Table 1. Dominant plant species**

Tree	(1) <i>Pinus ponderosa</i>
Shrub	(1) <i>Artemisia nova</i>
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Festuca arizonica</i>

## Physiographic features

This site is located in mountain valleys in the ponderosa pine zone. It has gentle to moderate slopes and receives occasional light overflow from the main stream course or adjacent side slopes. Along valley bottoms where drainage is poor, it blends with the Mountain Meadow range site. Slopes range from nearly level up to about 12 percent. Plant production tends to gradually decrease as the slope becomes steeper, due to less benefit from run-on water; but there are no clear breaks in effects of slope. Elevations are about 6000 to 8200 feet.

**Table 2. Representative physiographic features**

Landforms	(1) Terrace (2) Hillslope
Runoff class	Low
Flooding frequency	None
Ponding frequency	None
Elevation	6,000–8,200 ft
Slope	1–12%
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)	17-18 in
Frost-free period (actual range)	5-101 days
Freeze-free period (actual range)	43-134 days
Precipitation total (actual range)	17-19 in
Frost-free period (average)	54 days
Freeze-free period (average)	92 days
Precipitation total (average)	18 in

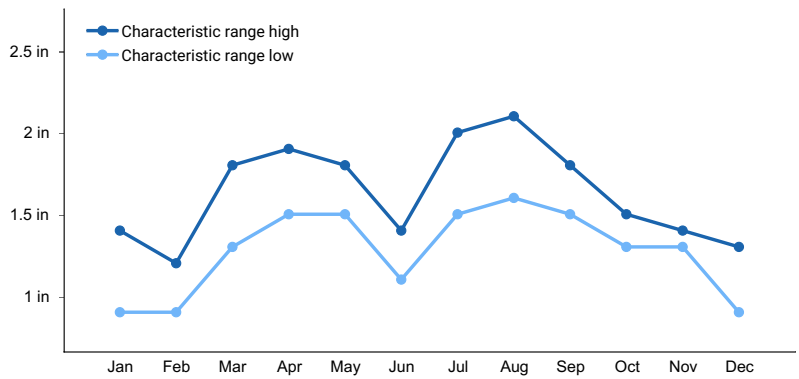


Figure 1. Monthly precipitation range

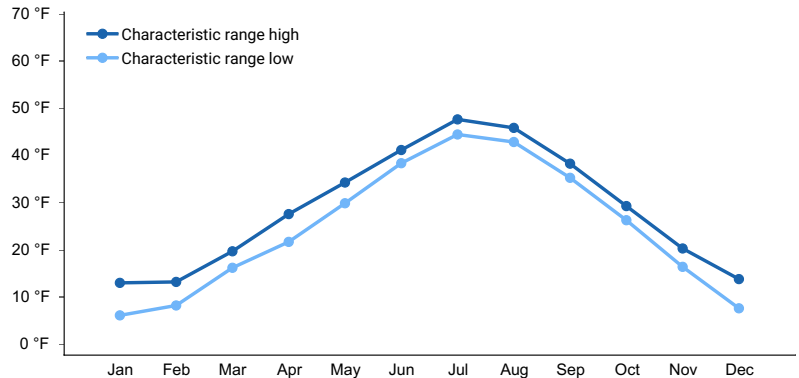


Figure 2. Monthly minimum temperature range

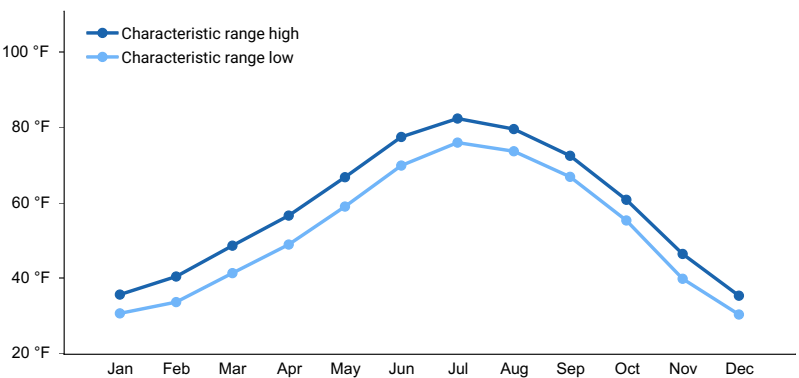


Figure 3. Monthly maximum temperature range

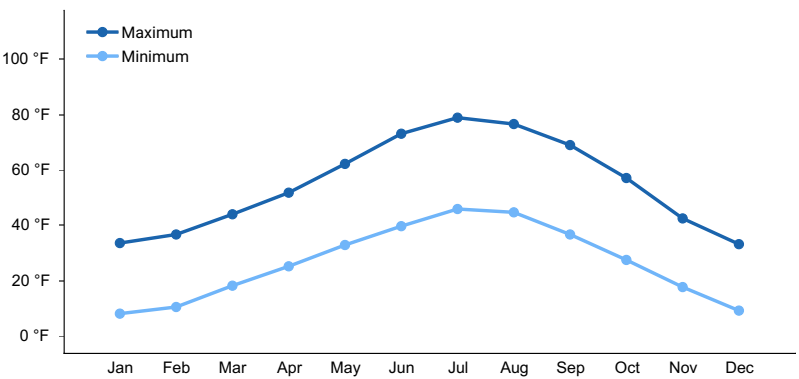


Figure 4. Monthly average minimum and maximum temperature

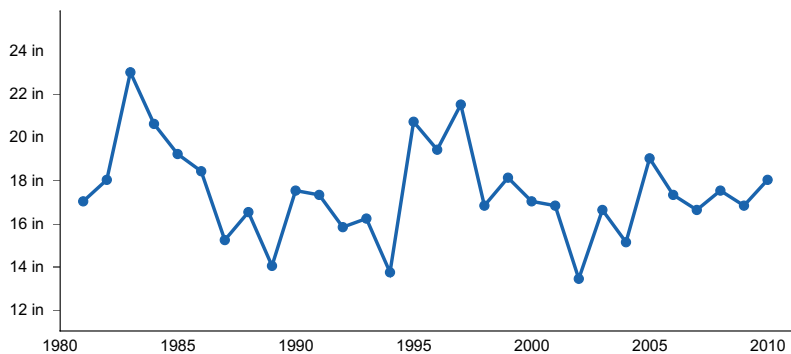


Figure 5. Annual precipitation pattern

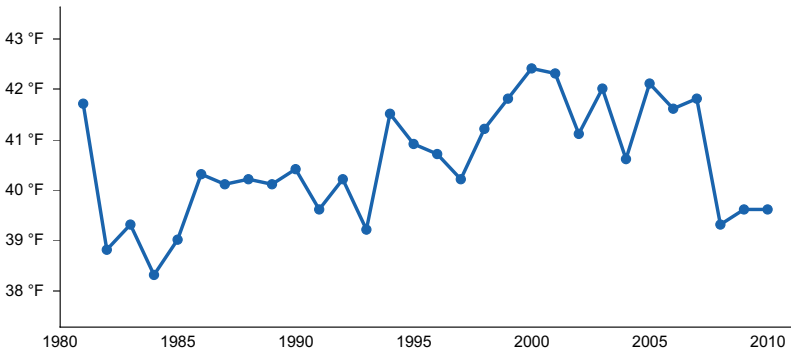


Figure 6. Annual average temperature pattern

### Climate stations used

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

### Influencing water features

None

### Soil features

The soils are deep or moderately deep, having developed on alluvial deposits mostly from marine shale parent materials. Typically, a dark clayey surface soil overlies a well developed clay subsoil. In some cases there is a thin dark loam surface layer, but the major influence is from heavier material. Water intake rates may be low, especially if vegetation is depleted. Permeability is slow to very slow, but excellent storage of water favors extension of growth into dry weather. The relatively short roots of Kentucky bluegrass where it has invaded do not use this storage efficiently. The high wilting point can be a significant factor in dry summers. These soils when dry, may require as much as 2.5 inches of water to wet one foot of soil making light showers ineffective. The shrink-swell and erosive potentials are high. Severe gullyng can carry off most of the extra water and loss of topsoil greatly reduces water intake.

Soils correlated to this site:

Fine: Agua Fria, Echolake and Herm

Table 4. Representative soil features

Parent material	(1) Slope alluvium–shale (2) Alluvium–sandstone and shale
Surface texture	(1) Clay loam (2) Loam
Family particle size	(1) Fine
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	20–100 in
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (Depth not specified)	4.5–7.5 in
Soil reaction (1:1 water) (Depth not specified)	6.6–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–20%

## Ecological dynamics

The dominant aspect of the site is grassland, although ponderosa pine may occur in small amounts. Western wheatgrass is usually the dominant grass with substantial amounts of Arizona fescue, mountain muhly, and Letterman needlegrass. Needle-and-thread is also a major grass in places. Scattered clumps of Gambel oak, snowberry, serviceberry, and similar shrubs may occur on the side slopes included in the site, and low shrubby plants such as black sage may be scattered over the site in minor amounts. Forbs and shrubs do not make up more than about 20% of the annual yield. A number of plants add to the community, generally in small amounts. Among them are slender wheatgrass, Indian ricegrass, Junegrass, muttongrass, Parry oatgrass, spike muhly, elk sedge, squirreltail, Baltic rush, herbaceous sage, herbaceous cinquefoil, buckwheats, members of the loco-milkvetch group, lupine, penstemon, trailing fleabane, aster, bitterbrush, mountain mahogany, fringed sagebrush, big sagebrush, and in some spots silver sagebrush. Trace amounts of a few others may occur.

Tree species are ponderosa pine and an occasional juniper. Where pine occurs it is usually a light stand of "wolf" trees sometimes with a few seedlings.

Species most likely to invade the site or increase from trace amounts are Kentucky bluegrass, sleepygrass, rubber rabbitbrush, snakeweed, Colorado rubberweed, pussytoes, gumweed, introduced annuals, and native annuals such as owl clover and tarweed. Some of these usually move in as the ecological condition deteriorates, accompanied by a sharp increase in percentage of black sagebrush in many cases. Also likely to increase significantly are fringed, big, or silver sagebrush, Gambel oak, trailing fleabane, herbaceous sage, poison vetches, and herbaceous cinquefoil. Western wheatgrass may hold its own initially, but eventually breaks up into weak remnants. Most bunchgrass species listed above disappear with advanced deterioration. In this condition, black sage is often dominant, or there may be patches of sleepygrass and various annuals and other plants. Tarweed is conspicuous on some depleted areas.

Gullies which carry off extra water have drastically altered the moisture relationship in many places.

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

## State and transition model

## R048AY257CO Clayey Valley

### State 1: Reference State

#### 1.1 Light Overstory Ponderosa

Patchy mature Ponderosa with less cover in the understory trees. Dense grass and forb cover consisting mainly of Western wheatgrass, Arizona Fescue, mountain muhly and Letterman's needlegrass.

1.2A

#### 1.2 Light Ponderosa with Shrub cover

Mature scattered Ponderosa canopy with black sagebrush, gambel's oak and serviceberry  
Understory species are western wheatgrass and letterman's needlegrass.

1.1A

1.2B

1.3A

#### 1.3 Mature Ponderosa Pine

Mature scattered Ponderosa canopy with black sagebrush, gambel's oak and serviceberry  
Understory species are western wheatgrass and letterman's needlegrass

1.3B

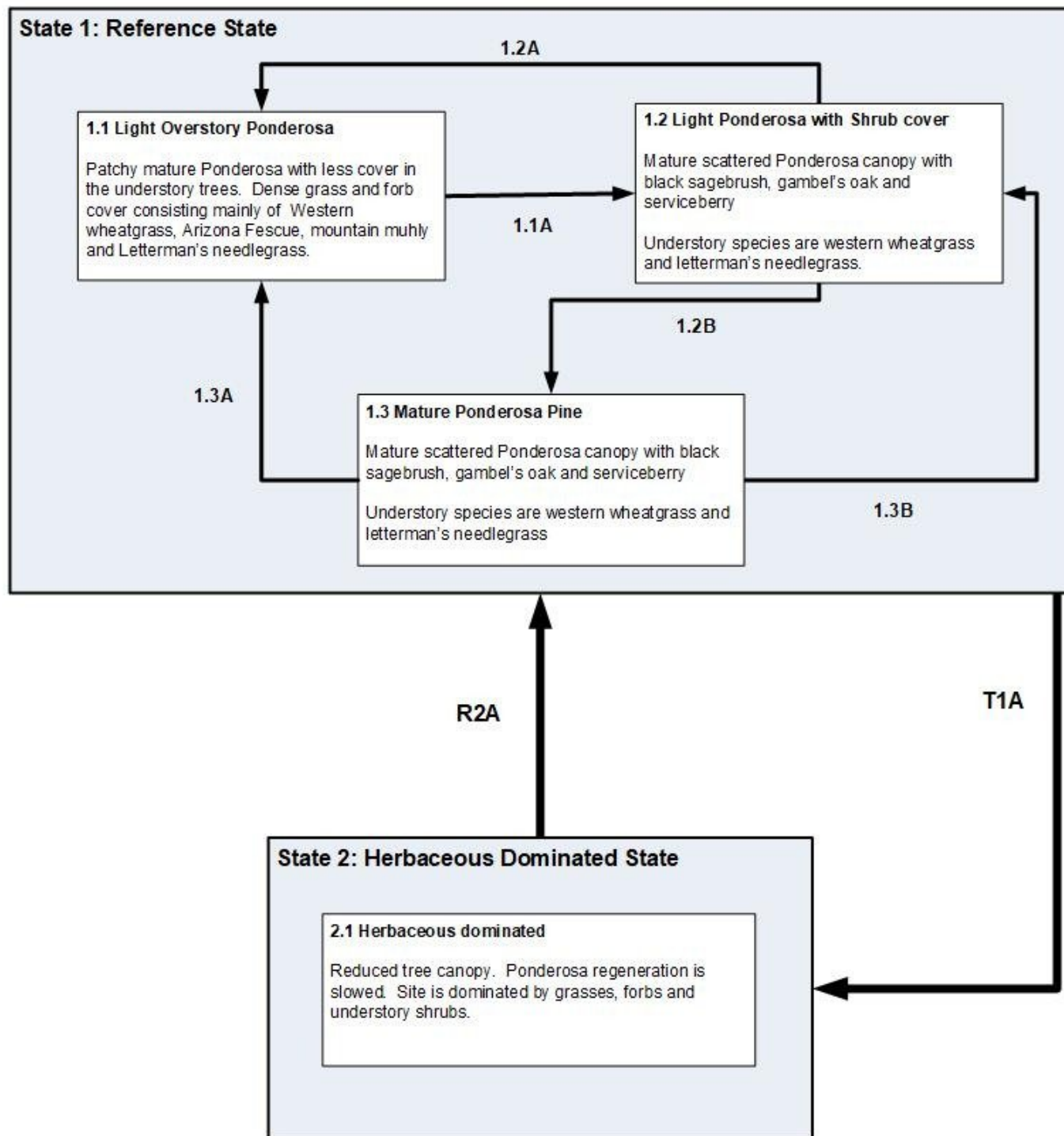
R2A

T1A

### State 2: Herbaceous Dominated State

#### 2.1 Herbaceous dominated

Reduced tree canopy. Ponderosa regeneration is slowed. Site is dominated by grasses, forbs and understory shrubs.



## Legend

1.1A, 1.2B – time without disturbance, wetter cycles, tree establishment, lack of fire

1.2A, 1.3A – disturbance, large scale fire, insect and diseases of trees, prolonged drought

1.3B – small scale fire and disturbances, insect and diseases of trees, prolonged drought

T1A – catastrophic wildfire

R2A – Seedling plantings, time without disturbance

### State 1

#### Reference State

### Community 1.1

#### Reference State

Species most likely to invade the site or increase from trace amounts are Kentucky bluegrass, sleepygrass, rubber rabbitbrush, snakeweed, Colorado rubberweed, pussytoes, gumweed, introduced annuals, and native annuals such as owl clover and tarweed. Some of these usually move in as the ecological condition deteriorates, accompanied by a sharp increase in percentage of black sagebrush in many cases. Also likely to increase significantly are fringed, big, or silver sagebrush, Gambel oak, trailing fleabane, herbaceous sage, poison vetches, and herbaceous cinquefoil. Western wheatgrass may hold its own initially, but eventually breaks up into weak remnants. Most bunchgrass species listed above disappear with advanced deterioration. In this condition, black sage is often dominant, or there may be patches of sleepygrass and various annuals and other plants. Tarweed is conspicuous on some depleted areas. Gullies which carry off extra water have drastically altered the moisture relationship in many places.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	750	1125	1500
Forb	100	150	200
Shrub/Vine	100	150	200
Tree	50	75	100
<b>Total</b>	<b>1000</b>	<b>1500</b>	<b>2000</b>

### Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Grasses/Grasslikes</b>			800–1400	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	300–600	–
	Arizona fescue	FEAR2	<i>Festuca arizonica</i>	150–300	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	150–300	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	150–300	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	75–150	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	75–150	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	35–125	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	35–125	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	35–125	–
<b>Forb</b>					
2	<b>Forbs</b>			125–225	
	cinquefoil	POTEN	<i>Potentilla</i>	35–125	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	35–125	–
	Forb, native	2FN	<i>Forb, native</i>	35–125	–
<b>Shrub/Vine</b>					
3	<b>Shrubs</b>			125–225	
	black sagebrush	ARNO4	<i>Artemisia nova</i>	75–150	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–75	–
	snowberry	SYMPH	<i>Symphoricarpos</i>	10–75	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	10–75	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	19–75	–
<b>Tree</b>					
4	<b>Trees</b>			50–100	
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	35–100	–

## Animal community

### WILDLIFE INTERPRETATIONS:

This site provides a medium value rating for deer, elk, cottontail, and wild turkey. It provides a low value rating for jackrabbit, upland game birds, and waterfowl.

### GRAZING INTERPRETATIONS:

The site provides a high value rating for cattle and horses and a medium rating for sheep.

## Recreational uses

Medium value rating.

## Wood products

Low value rating.

## Inventory data references

Field offices where this site exists are:

Cortez  
Durango  
Norwood  
Pagosa Springs

## Type locality

Location 1: Archuleta County, CO	
General legal description	Broad valleys between Pagosa Springs and Chromo in Archuleta County.

## 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). August 1975. Range Site Description for Clayey Valley #257. : 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

## Contributors

Suzanne Mayne-Kinney

## Approval

Kirt Walstad, 3/05/2024

## Acknowledgments

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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	05/02/2024
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

**Indicators**

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

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

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

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

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

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

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

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