

Major Land Resource Area 048A

Southern Rocky Mountains

Accessed: 05/10/2025

Ecological site keys

MLRA 48A Colorado

- I. Precipitation 9-12 inches(ustic bordering on aridic moisture regime); frigid temperature regime; approximately 6,000-8,000 feet in elevation – Semidesert climate zone
 - A. No water table or run-in moisture; soil depth is 20-40 inches; family particle size is fine-loamy; soil surface is sandy loam ... R048AY270CO – Valley Bench
 - B. Site not as above - Not Applicable
- II. Precipitation is 12-16 inches (aridic bordering on ustic moisture regime); frigid temperature regime; approximately 7,000 -8,500 feet in elevation - Dry Mountain/foothills/ climate zone (Note: This climate zone is called Upland in Utah sites.)
 - A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water
 - 1 Site has water table 12-72 inches in depth; soil depth is greater than 60 inches; family particle size is fine loamy; soil surface texture is loam ... R048AY243CO – Swale Meadow
 - 2 Site is not as above
 - i. Site in landscape position and receives run-in water, no water table in 6 feet; family particle size is fine-loamy; soil surface texture is loam, sandy loam, clay loam or gravelly sandy clay loam ... R048AY285CO – Foothill Swale
 - ii. Site not as above - Not Applicable
 - B. Site receives no extra water beyond normal precipitation
 - 1 Site has bedrock within 20 inches of the soil surface (shallow soil)
 - i. Site is located in the Gunnison Basin
 - a. Parent material is granite, gneiss, family particle size is loamy; soil surface texture is very gravely loam, very gravelly sandy loam or gravelly loam ... R048AA235CO – Dry Exposure Gunnison Basin LRU
 - b. Site not as above - Not Applicable
 - ii. Site not as above
 - a. Family particle size is clayey
 - 1) Parent material sandstone and/or shale; surface texture is channery loam, very channery loam, flaggy clay loam, channery silty clay loam, sandy loam, or gravelly coarse sandy loam ... R048AY235CO – Dry Exposure
 - 2) Site not as above - Not Applicable
 - b. Site not as above
 - 1) Family particle size is loamy-skeletal
 - a) Parent material sandstone, and/or siltstone; surface texture is loam, sandy loam, channery loam, or very gravelly loam ... F048AY448CO – Mountain Pinyon
 - b) Parent material sandstone and/or shale; surface texture is channery loam, very channery loam, flaggy clay loam, channery silty clay loam, sandy loam, or gravelly coarse sandy loam ... R048AY235CO – Dry Exposure
 - c) Site not as above - Not Applicable

2) Site not as above

a) Family particle size is loamy

- (1) Parent material sandstone, and/or siltstone; surface texture is loam, sandy loam, channery loam, or very gravelly loam ... F048AY448CO – Mountain Pinyon
- (2) Parent material sandstone and/or shale; surface texture is channery loam, very channery loam, flaggy clay loam, channery silty clay loam, sandy loam, or gravelly coarse sandy loam ... R048AY235CO – Dry Exposure
- (3) Parent material limestone or sandstone; surface texture is sandy loam or gravelly sandy loam ... R048AY307CO – Shallow Slopes
- (4) Site not as above - Not Applicable

b) Site not as above - Not Applicable

2 Site not as above, site is greater than 20 inches to bedrock

i. Soils are skeletal soils (greater than 35% rock fragments)

a. Family particle size is loamy-skeletal

1) Site occurs as long narrow belts on fan terraces, alluvial fans and glacial outwash plains adjacent to the Arkansas River

- a) Parent material is outwash and alluvium; surface texture is stony sandy loam or very gravelly loamy sand ... R048AY282CO – Boulder Flats
- b) Site not as above - Not Applicable

2) Site not as above

- a) Parent material is basalt, sandstone, and/or shale; soil surface is stony sandy loam, gravelly sandy loam, very cobbly loam, or very stony sandy loam; slope is 3-30% ... R048AY287CO – Stony Foothills
- b) Parent material shale, sandstone, and/or basalt, surface texture is cobbly sandy loam, cobbly loam, very flaggy loam or channery loam; slope is 25-65% ... R048AY303CO – Loamy Slopes
- c) Site not as above - Not Applicable

b. Site is not loamy-skeletal family particle size

- 1) Family particle size is sandy-skeletal, soil surface texture is generally a gravelly sandy loam; site occurs on fan terraces and alluvial fans ... R048AY316CO – Dry Mountain Outwash
- 2) Site not as above - Not Applicable

ii. Site not as above, soils are non-skeletal (less than 35% rock fragments)

a. Family particle size is fine

- 1) Parent material is sandstone and shale; surface texture is a loam ... R048AY244CO – Mountain Shale
- 2) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is coarse-loamy.

- a) Parent material is alluvium; surface textures is sandy loam, gravelly sandy loam, or gravelly loam ... R048AY272CO – Sandy Bench
- b) Site not as above - Not Applicable

2) Site not as above

a) Family particle size is fine-loamy

- (1) Located in the Gunnison Basin
 - (a) Parent material is rhyolite, sedimentary rock, or granite; soil surface textures is gravelly sandy loam or fine sandy loam ... R048AA231CO – Dry Mountain Loam Gunnison Basin LRU

(b) Site not as above - Not Applicable

(2) Site not as above

(a) Parent material is sedimentary rock, basalt or sandstone; soil surface texture is loam ... R048AY231CO – Dry Mountain Loam

(b) Parent material is sandstone and shale, or basalt; soil surface texture is loam, very channery loam, or sandy clay loam ... R048AY292CO – Deep Loam

(c) Parent material is sandstone and shale; soil surface texture is loam ... R048AY242CO – Dry Mountain Shale

(d) Site is located in the Westcliffe area, parent material is alluvium, colluvium and eolian materials; soil surface is sandy loam or gravelly sandy loam ... R048AY226CO – Mountain Loam 13-18 PZ Westcliffe Area

(e) Site not as above - Not Applicable

b) Site not as above - Not Applicable

III. Precipitation 16-20 inches (typic ustic moisture regime); frigid or cryic temperature regime; approximately 7,000-9,000 feet in elevation – Mountains climate zone

A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water

1 Site has perennial water table 0-24 inches in depth; soil depth is greater 40 inches; family particle size is fine-loamy or fine

i. Site located in the Gunnison Basin ... R048AA241CO – Mountain Meadow Gunnison Basin LRU

ii. Site not as above ... R048AY241CO – Mountain Meadow

2 Site not as above

i. Site located in the Gunnison Basin

a. Water table 60 inches or greater in depth and seasonally in early spring; family particle size is fine-loamy ... R048AA245CO – Mountain Swale Gunnison Basin LRU

b. Site not as above - Not Applicable

ii. Site not as above

a. Site in landscape position that receives run-in water; 60 inches or greater in depth; no water table present in 6 feet; family particle size – fine-loamy ... R048AY245CO – Mountain Swale

b. Site not as above - Not Applicable

B. Site receives no extra water beyond normal precipitation

1 Site has bedrock within 20 inches of the soil surface (shallow soil)

i. Family particle size is loamy

a. Parent material is tachylyte, volcanic breccia, igneous rock, tuff, granite, gneiss and/or sandstone; surface soil textures is gravelly sandy loam, channery loam, or fine sandy loam ... R048AY230CO – Shallow Loam

b. Parent material is sandstone, shale, siltstone, igneous rock and/or metamorphic rock; surface texture is loam, gravelly loam, cobbly loam, stony loam, channery sandy loam, gravelly fine sandy loam, sandy loam, or fine sandy loam ... R048AY255CO – Pine Grasslands

c. Site not as above - Not Applicable

ii. Site not as above

a. Site is loamy-skeletal

1) Parent material is granite, gneiss, phyllite, schist, sandstone and/or limestone; Soil surface texture is gravelly sandy loam, channery loam or fine sandy loam ... R048AY229CO – Rocky Loam

2) Parent material is tachylyte, volcanic breccia, igneous rock, tuff, granite, gneiss and/or sandstone; surface soil textures is gravelly sandy loam, channery loam, or fine sandy loam ... R048AY230CO – Shallow Loam

3) Parent material is monzonite, granite, gneiss and/or granodiorite; surface soil textures is very

gravelly sandy loam ... R048AY218CO – Dry Shallow Pine

4) Parent material is volcanic breccia, granite, gneiss, sandstone, and/or granodiorite; surface soil textures is very gravelly sandy loam, gravelly sandy loam, or very gravelly loam ... R048AY240CO – Shallow Pine

5) Parent material is sandstone, shale, siltstone, igneous rock and/or metamorphic rock; surface texture is loam, gravelly loam, cobbly loam, stony loam, channery sandy loam, gravelly fine sandy loam, sandy loam, or fine sandy loam ... R048AY255CO – Pine Grasslands

6) Site not as above - Not Applicable

b. Site not as above - Not Applicable

2 Site not as above, site is greater than 20 inches to bedrock

i. Soils are skeletal soils (greater than 35% rock fragments)

a. Family particle size is sandy-skeletal

1) Parent material is alluvium and outwash; surface texture is gravelly sandy loam or stony sandy loam ... R048AY311CO – Mountain Outwash

2) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is clayey-skeletal

a) Parent material is sandstone and/or shale; surface texture is loam or clay loam ... R048AY238CO – Brushy Loam

b) Parent material is igneous, metamorphic and sedimentary rock; surface texture is very gravelly sandy clay loam, very stony loam or gravelly loam ... R048AY239CO – Brushy Mountain Loam

c) Site not as above - Not Applicable

2) Site not as above

a) Family particle size is loamy-skeletal

(1) Parent material is basalt, sandstone, till, outwash, schist, granite, gneiss, igneous and/or metamorphic rock; soil surface texture is stony loam, extremely stony loam, cobbly loam, very stony loam, cobbly sandy loam or very cobbly sandy loam ... R048AY237CO – Stony Loam

(2) Parent material is sandstone and/or shale; surface texture is loam or clay loam ... R048AY238CO – Brushy Loam

(3) Parent material is igneous, metamorphic and sedimentary rock; surface texture is very gravelly sandy clay loam, very stony loam or gravelly loam ... R048AY239CO – Brushy Mountain Loam

(4) Site not as above - Not Applicable

b) Site not as above - Not Applicable

ii. Site not as above, soils are non-skeletal (less than 35% rock fragments)

a. Family particle size is fine-silty

1) Parent material is sandstone, shale, siltstone, igneous rock and/or metamorphic rock; surface texture is loam, gravelly loam, cobbly loam, stony loam, channery sandy loam, gravelly fine sandy loam, sandy loam, or fine sandy loam ... R048AY255CO – Pine Grasslands

2) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is fine-loamy

a) Located in the Gunnison Basin

(1) Parent material is rhyolite, granite volcanic rock, sedimentary rock, igneous and/or metamorphic rock; surface texture is loam or gravelly sandy loam ... R048AA228CO – Mountain Loam Gunnison Basin LRU

(2) Site not as above - Not Applicable

b) Site not as above

- (1) Parent material is sandstone, shale, igneous rock, metamorphic rock, schist, and/or granite. Surface texture is loam, sandy loam, gravelly sandy loam or silt loam; 0-30% slope ... R048AY228CO – Mountain Loam
- (2) Parent material is granite, gneiss, schist, sandstone, shale, igneous rock and/or metamorphic rock, surface texture is loam or sandy loam, slope 0-30% ... R048AY222CO – Loamy Park
- (3) Parent material is igneous, metamorphic and/or sedimentary rock; surface texture is very gravelly sandy clay loam, very stony loam or gravelly loam; 3-50% slope ... R048AY239CO – Brushy Mountain Loam
- (4) Parent material is sandstone, shale, siltstone, igneous rock and/or metamorphic rock; surface texture is loam, gravelly loam, cobbly loam, stony loam, channery sandy loam, gravelly fine sandy loam, sandy loam, or fine sandy loam; 0-30% slope ... R048AY255CO – Pine Grasslands
- (5) Parent material is sandstone; surface texture is cobbly fine sandy loam; slope is 25-75% ... R048AY379CO – Brushy Slopes
- (6) Site not as above - Not Applicable

2) Site not as above

a) Family particle size is fine

- (1) Located on the western slope in Colorado around the Grand Mesa to the North/West part of the San Juan Mountains and the Gunnison Basin (Shale Highlands LRU); parent material is Mancos/ Wasatch shale and/or siltstone; surface texture is clay loam, silty clay loam or loam ... R048AA247CO – Deep Clay Loam Shale Highlands LRU
- (2) Not located in Shale Highland LRU (Grand Mesa to the North/West part of the San Juan Mountains and the Gunnison Basin); Parent material is shale, igneous rock, metamorphic rock and/or sedimentary rock, surface texture is clay loam, loam, or silt loam ... R048AY247CO – Deep Clay Loam
- (3) Parent material sandstone and/or shale. Surface texture is loam, clay loam, very stony loam, cobbly loam, sandy loam, cobbly sandy loam, very bouldery sandy loam, or fine sandy loam ... F048AY925CO – Ponderosa Pine Forest
- (4) Parent material sandstone and shale; surface texture is loam, clay loam, or very cobbly loam ... R048AY234CO – Mountain Clay
- (5) Parent material is sandstone, shale, siltstone, igneous rock and/or metamorphic rock; surface texture is loam, gravelly loam, cobbly loam, stony loam, channery sandy loam, gravelly fine sandy loam, sandy loam, or fine sandy loam ... R048AY255CO – Pine Grasslands
- (6) Parent material is shale, sandstone and/or siltstone; surface texture is clay loam, loam, gravelly loam, or silty clay loam ... R048AY248CO – Mountain Clay Loam
- (7) Parent material is shale and/or sandstone; surface textures is clay loam or loam ... R048AY257CO – Clayey Valley
- (8) Site not as above - Not Applicable

b) Site not as above - Not Applicable

IV. Precipitation 20-40 inches (ustic udic and typic udic); cryic temperature regime; below tree-line; approximately 8,000 – 10,000 feet in elevation - Subalpine Climate zone

A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water

1 Site occurs on the Grand Mesa; precipitation is 37-45 inches; Site in landscape position and receives run-in water; 20 inches or greater in depth; no water table present in 6 feet; family particle size is fine-loamy, clayey-skeletal or loamy-skeletal; soil surface texture is loam or gravelly loam ... R048AY253CO – Wet Subalpine

2 Site not as above - Not Applicable

B. Site receives no extra water beyond normal precipitation

1 Site has bedrock within 20 inches of the soil surface

i. Family particle size is loamy

- a. Precipitation is 20-30 inches; Parent material is sandstone, shale; basalt, andesite, tuff breccia and/or rhyolite; surface texture – loam, channery loam, sandy loam, extremely stony loam, gravelly silt loam or gravelly loam ... R048AY251CO – Shallow Subalpine
- b. Site not as above - Not Applicable

ii. Site not as above

a. Family particle size is clayey-skeletal

- 1) Precipitation is 20-30 inches; parent material is shale and/or sandstone; surface texture is very gravelly loam, fine sandy loam or cobbly fine sandy loam ... F048AY912CO – Lodgepole Pine
- 2) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is loamy-skeletal

- a) Precipitation is 20-30 inches; Parent material is sandstone, shale; basalt, andesite, tuff breccia and/or rhyolite; surface texture – loam, channery loam, sandy loam, extremely stony loam, gravelly silt loam or gravelly loam ... R048AY251CO – Shallow Subalpine
- b) Precipitation is 20-30 inches; parent material is shale and/or sandstone; surface texture is very gravelly loam, fine sandy loam or cobbly fine sandy loam ... F048AY912CO – Lodgepole Pine
- c) Site not as above - Not Applicable

2) Site not as above - Not Applicable

2 Not as above, site is greater than 20 inches in depth to bedrock

i. Rock fragments greater than 35%

a. Family particle size is clayey-skeletal

- 1) Precipitation is 20-30 inches; parent material is shale and/or sandstone; surface texture is very gravelly loam, fine sandy loam or cobbly fine sandy loam ... F048AY912CO – Lodgepole Pine
- 2) Precipitation is 20-30 inches; parent material is igneous, metamorphic rock, sedimentary rock; sandstone and shale, diorite and or rhyolite; surface texture is loam, stony loam, very stony loam, cobbly loam, gravelly loam or very cobbly loam ... F048AY449CO – Aspen Woodland
- 3) Precipitation is 20-40 inches; parent material is igneous rock, metamorphic rock, sedimentary rock, sandstone and shale and/or volcanic breccia; surface texture is very cobbly sandy loam, very gravelly sandy loam very stony sandy loam, very cobbly fine sandy loam, stony fine sandy loam, loam, cobbly loam or gravelly loam ... F048AY918CO – Spruce-Fir Woodland
- 4) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is Loamy-skeletal

- a) Precipitation is 20 to 25 inches; parent material is sandstone and shale, andesite, or sedimentary rock; surface texture is very stony loam, loam, clay loam, stony sandy clay loam, or very stony sandy loam ... F048AY924CO – Douglas Fir/Gambel Oak
- b) Precipitation is 20-30 inches; parent material is igneous, metamorphic rock, sedimentary rock; sandstone and shale, diorite and or rhyolite; surface texture is loam, stony loam, very stony loam, cobbly loam, gravelly loam or very cobbly loam ... F048AY449CO – Aspen Woodland
- c) Precipitation is 20-30 inches; parent material is shale and/or sandstone; surface texture is very gravelly loam, fine sandy loam or cobbly fine sandy loam ... F048AY912CO – Lodgepole Pine
- d) Precipitation is 20-40 inches; parent material is granite, sandstone and shale, volcanic rock, gneiss, mica schist, or sandstone; surface textures is loam, very gravelly sandy loam,

very stony sandy loam, stony sandy loam, stony loam, very stony loam, very cobbly loam, or gravelly fine sandy loam ... F048AY908CO – Mixed Conifer

e) Precipitation is 20-40 inches; parent material is volcanic breccia; surface texture is cobbly ashy loam, cobbly ashy silt loam or cobbly loam ... F048AY915CO – Engelmann Spruce – Whortleberry– Jacob's-Ladder

f) Precipitation is 20-40 inches; parent material is volcanic breccia or sandstone; surface textures is stony loam, stony ashy loam, or cobbly ashy loam ... F048AY917CO – Abies lasiocarpa/Paxistima myrsinites/Erigeron eximius

g) Precipitation is 20-40 inches; parent material is volcanic breccia; surface textures is very stony ashy loam ... F048AY919CO – Subalpine Fir/Blueberry/Twinflower

h) Precipitation is 20-40 inches; parent material is volcanic breccia or tuff; surface textures is stony ashy loam or cobbly loam ... F048AY921CO – White Fir/Snowberry

i) Precipitation is 20-40 inches; parent material is igneous rock, metamorphic rock, sedimentary rock, sandstone and shale and/or volcanic breccia; surface texture is very cobbly sandy loam, very gravelly sandy loam very stony sandy loam, very cobbly fine sandy loam, stony fine sandy loam, loam, cobbly loam or gravelly loam ... F048AY918CO – Spruce-Fir Woodland

j) Site not as above - Not applicable

2) Site not as above - Not Applicable

ii. Site is not as above, rock fragments less than 35%

a. Family particle size is fine

1) Precipitation is 20-30 inches; parent material is igneous, metamorphic rock, sedimentary rock; sandstone and shale, diorite and or rhyolite; surface texture is loam, stony loam, very stony loam, cobbly loam, gravelly loam or very cobbly loam ... F048AY449CO – Aspen Woodland

2) Precipitation is 20-30 inches; parent material is sandstone and shale; or igneous, metamorphic and sedimentary rock; surface texture is loam, clay loam or silt loam ... R048AY252CO – Subalpine Clay

3) Site not as above - Not Applicable

b. Site not as above

1) Family particle size is fine-loamy

a) Precipitation is 20 to 25 inches; parent material is sandstone and shale, andesite, or sedimentary rock; surface texture is very stony loam, loam, clay loam, stony sandy clay loam, or very stony sandy loam ... F048AY924CO – Douglas Fir/Gambel Oak

b) Located in Gunnison Basin; precipitation is 20-30 inches; parent materials andesite, rhyolite or sandstone and shale; surface texture is loam ... R048AA250CO – Subalpine Loam Gunnison Basin LRU

c) Site not in the Gunnison Basin; parent material is sandstone, shale, volcanic rock, or igneous, metamorphic and sedimentary rock; surface texture is loam ... R048AY250CO – Subalpine Loam

d) Precipitation is 20-30 inches; parent material is igneous, metamorphic rock, sedimentary rock; sandstone and shale, diorite and or rhyolite; surface texture is loam, stony loam, very stony loam, cobbly loam, gravelly loam or very cobbly loam ... F048AY449CO – Aspen Woodland

e) Precipitation is 20-40 inches; parent material is granite, sandstone and shale, volcanic rock, gneiss, mica schist, or sandstone; surface textures is loam, very gravelly sandy loam, very stony sandy loam, stony sandy loam, stony loam, very stony loam, very cobbly loam, or gravelly fine sandy loam ... F048AY908CO – Mixed Conifer

f) Precipitation is 20-40 inches; parent material is igneous rock, metamorphic rock, sedimentary rock, sandstone and shale and/or volcanic breccia; surface texture is very cobbly sandy loam, very gravelly sandy loam very stony sandy loam, very cobbly fine sandy loam, stony fine sandy loam, loam, cobbly loam or gravelly loam ... F048AY918CO – Spruce-Fir

Woodland

g) Site not as above - Not applicable

2) Site not as above - Not Applicable

V. Precipitation is 30-50 inches (Typic Udic); cryic temperature regime; above tree-line; approximately 10,000-14,440 feet in elevation - Alpine Climate Zone

A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water

1 Site has perennial water table 0-12 inches in depth; soil depth is greater than 60 inches; soil surface texture is loam, cobbly loam or silt loam ... R048AY305CO – Alpine Meadow

2 Site not as above

i. Site occurs on the Grand Mesa; precipitation is 37-45 inches; Site in landscape position and receives run-in water; 20 inches or greater in depth; no water table present in 6 feet; family particle size is fine-loamy, clayey-skeletal or loamy-skeletal; soil surface texture is loam or gravelly loam ... R048AY253CO – Wet Subalpine

ii. Site not as above - Not Applicable

B. Site receives no extra water beyond normal precipitation

1 Site have bedrock within 20 inches of the soil surface

i. Family particle size is loamy or loamy-skeletal; Surface texture is very gravelly loam, very stony loam, very cobbly loam, very stony sandy loam, very cobbly sandy loam, loam or very cobbly silt loam ... R048AY308CO – Shallow Alpine

ii. Site not as above - Not Applicable

2 Not as above, Site is greater than 20 inches in depth to bedrock

i. Rock fragments greater than 35% and family particle size is loamy-skeletal

a. 0-30% slopes

1) Parent material is colluvium, till, basalt, rhyolite, tuff, volcanic breccia, and/or andesite; soil surface texture is very gravelly loam, cobbly loam, stony loam, or gravelly silt loam ... R048AY306CO – Shrubby Alpine

2) Parent material rhyolite, tuff, volcanic rock and/or sandstone; soil surface texture is very gravelly loam, loam, or very stony sandy loam; 10-60% slopes ... R048AY309CO – Warm Alpine

3) Site not as above - Not applicable

b. Slopes is 30-60%

1) Parent material rhyolite, tuff, volcanic rock and/or sandstone; soil surface texture is very gravelly loam, loam, or very stony sandy loam; 10-60% slopes ... R048AY309CO – Warm Alpine

2) Parent material is monzonite, diorite, conglomerate, rhyolite, volcanic rock sandstone, granite, gneiss, schist, andesite, tuffigneous rock and/or metamorphic rock; Surface texture is very gravelly loam, gravelly loam, extremely gravelly loam, very cobbly loam, extremely cobbly loam, very stony loam, or extremely stony sandy loam; 30-60% slopes ... R048AY304CO – Alpine Slopes

3) Site not as above - Not applicable

ii. Site not as above - Not applicable

MLRA 48A Key New Mexico

I. Located in LRU RM-1. These sites are found on the east side of Sangre de Cristo mountains.

A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water

1 Site has water table 0-36 inches in depth, soil depth is > 60 inches; family particle size is fine or fine loamy ... R048AY006NM – Mountain Meadow

2 Site not as above

- i. Site in landscape position that receives run-in water, no water table present in 6 feet; family particle size is fine-loamy or fine ... R048AY003NM – Mountain Valley
- ii. Site not as above - not written

B. Site receives no extra water beyond normal precipitation

1 Precipitation is 20-30"; Elevation is 9,000 ft or higher – Subalpine climate zone

- i. Parent material basalt; soils depth is greater than 60 inches; family particle size can be fine, fine-loamy or loamy-skeletal ... R048AY001NM – Subalpine Grassland
- ii. Site not as above not written or see Colorado MLRA 48A key for more sites ... Key 1 – MLRA 48A Colorado

2 Precipitation is usually 16-20 inches (precipitation can range from 15 to 25 with aspect differences); elevation is approximately 7,000 to 9,000 feet.– Mountain climate zone

- i. Site has bedrock within 20 inches of the soil surface
 - a. Parent material is shale
 - 1) Family particle size is fine ... R048AY007NM – Mountain Shale
 - 2) Site not as above
 - a) Family particle size is loamy ... R048AY008NM – Mountain Brush
 - b) Site not as above - not written
 - b. Parent material is not shale
 - 1) Soils are skeletal (greater than 35% rock fragments)
 - a) Parent material basalt, volcanic rock and metamorphic rock; family particle size is clayey-skeletal or loamy-skeletal ... R048AY005NM – Mountain Malpais
 - b) Site not as above - not written
 - 2) Site not as above
 - a) Parent material sandstone, shale, basalt and limestone family particle size is loamy ... R048AY008NM – Mountain Brush
 - b) Site not as above - not written
- ii. Site not as above - soil depth is greater than 20 inches
 - a. Soils are skeletal (greater than 35% rock fragments)
 - 1) Family particle size – clayey-skeletal ... R048AY004NM – Mountain Loam
 - 2) Site not as above - not written
 - b. Site not as above
 - 1) Fine family particle size
 - a) Parent material is shale, soil depth 20-40 inches ... R048AY007NM – Mountain Shale
 - b) Site not as above
 - (1) Parent material is basalt, igneous rock, metamorphic rock, sandstone, shale, or other sedimentary rock, soil depth greater than 40 inches ... R048AY002NM – Mountain Grassland
 - (2) Site not as above - not written
 - 2) Site not as above
 - a) Site is fine-loamy family particle size
 - (1) Parent material is basalt, igneous rock, metamorphic rock, sandstone, shale, or other sedimentary rock, soil depth greater than 40 inches ... R048AY002NM – Mountain Grassland
 - (2) Site not as above - not written
 - b) Site not as above - not written

II. Located in LRU RM-2. These sites are found on the west side of Sangre de Cristo mountains, Tusas Mountains

(southern San Juan mountains) and Jemez Mountains.

- A. Site receives extra water beyond normal precipitation through high water table, riparian area, or run-in water
 - 1 Site has water table 0-60 inches in depth, soil depth is greater than 60 inches; family particle size is fine or fine loamy ... R048AY016NM – Mountain Meadows
 - 2 Site not as above
 - i. Site in landscape position and receives run-in water, no water table present in 6 feet; family particle size –fine; parent material - shale ... R048AY014NM – Mountain Valley Dry
 - ii. Site not as above - not written
- B. Site receives no extra water beyond normal precipitation
 - 1 Precipitation is 25-40"; approximately 9,000 to 12,000 feet in elevation – Subalpine climate zone
 - i. Soils depth is greater than 60 inches; family particle size is loamy-skeletal; parent material, rhyolite, granite, gneiss, volcanic rock metamorphic ... R048AY011NM – Subalpine Grassland Dry
 - ii. Site not as above not written or see Colorado MLRA 48A key for more sites ... Key 1 – MLRA 48A Colorado
 - 2 Precipitation is 16-25"; approximately 7,000 to 9,000 feet in elevation Mountain climate zone
 - i. Site has bedrock within 20 inches of the soil surface
 - a. Family particle size is clayey
 - 1) Parent material – sandstone and/or shale ... R048AY015NM – Mountain Shale Dry
 - 2) Site not as above
 - a) Parent material - igneous rock and/or metamorphic rock ... R048AY010NM – Pine Grassland
 - b) Site not as above - not written
 - b. Site not as above - not written
 - ii. Site not as above - soil depth is greater than 20 inches
 - a. Site has greater than 35% rock fragments
 - 1) Family particle size is clayey-skeletal; parent material is igneous rock and/or metamorphic rock ... R048AY010NM – Pine Grassland
 - 2) site not as above
 - a) Family particle size is loamy-skeletal; parent material is igneous rock and/or metamorphic rock ... R048AY009NM – Mountain Breaks
 - b) Site not as above
 - (1) Family particle size is loamy-skeletal; parent material is rhyolite, tuff, sandstone and/or shale ... R048AY012NM – Mountain Loam Dry
 - (2) Site not as above - not written
 - b. Site not as above; less than 35% rock fragments
 - 1) Family particle size is fine; parent material is sandstone and/or shale
 - a) Surface texture is loam and soil depth is greater than 20 inches ... R048AY013NM – Mountain Slopes
 - b) Site not as above
 - (1) Surface texture clay loam or channery clay loam; soils are 20-40 inches in depth ... R048AY015NM – Mountain Shale Dry
 - (2) Site not as above - not written
 - 2) Site not as above
 - a) Family particle size is fine-loamy
 - (1) Parent material is igneous rock and/or metamorphic rock, soil surface texture is gravelly loam, soil depth greater than 60 inches ... R048AY009NM – Mountain Breaks
 - (2) Site not as above

- (a) Parent material is rhyolite, tuff, sandstone and/or shale; soil surface texture is loam or silt loam, soil depth greater than 60 inches ... R048AY012NM – Mountain Loam Dry
 - (b) Site not as above - not written
- b) Site not as above - not written

MLRA 48A - Utah

- I. Site receives extra water beyond normal precipitation through high water table and/or run-in water
 - A. Water table depth is generally 50 inches or greater below the surface and soils are loamy skeletal (>35% rock fragment)
 - 1 Dominant aspect of this site is shrubs ... R048AY007UT – Loamy Bottom (Basin Big Sagebrush/Basin Wildrye)
 - 2 Dominant aspect of this site is shrub
 - i. Site dominated by willows, soil profile is fine loamy (low rock content, 18-35% clay) ... R048AY008UT – Wet Fresh Meadow (Willow-Sedge)
 - ii. Site dominated by willow, and soil profile is coarse loamy (<35% rock fragments) ... R048AY010UT – Wet Fresh Streambank (Willow)
 - 3 Soil sub-surface gravel volume is generally greater than 30% and dominant tree is narrowleaf cottonwood
 - i. Soil sub-surface gravel volume is generally greater than 30% and dominant tree is narrowleaf cottonwood ... R048AY005UT – Semiwet Fresh Streambank (Narrowleaf Cottonwood)
 - ii. Soil sub-surface gravel volume is less than 10% and the dominant tree is water birch ... R048AY006UT – Semiwet Fresh Streambank
- II. Greater than 35" annual precipitation
 - A. Site is above timberline
 - 1 Gravels on surface are greater than 20% and soil profile is loamy-skeletal and fragmental (>35% rock fragments by volume) ... R048AY610UT – Alpine Slope
 - B. 22" - 40" annual precipitation
 - 1 Slope generally less than 30%
 - i. Surface soil texture loam and soil profile contains less than 10% rock fragment by volume ... R048AY516UT – High Mountain Loam (Mountain Big Sagebrush)
 - ii. Surface soil texture loam to silt loam and soil profile contains greater than 10% rock fragment by volume ... R048AY503UT – High Mountain Clay
 - iii. Soil depth is generally moderately deep to deep (20-60") with gravels on the surface less than 15% by volume ... F048AY506UT – High Mountain Loam (Aspen)
 - iv. Soil depth is generally moderately deep (20-40") and are generally associated/adjacent to aspen sites dominated by herbaceous species ... R048AY515UT – High Mountain Loam (Thurber Fescue)
 - v. Soil depths generally shallow (< 20%) with gravelly silt loam surface texture. ... R048AY518UT – High Mountain Gravelly Loam (Mountain Big Sagebrush)
 - 2 Slope generally greater than 30%
 - i. Rock fragments in the top 24" generally greater than 50% by volume
 - a. Surface textures are generally gravelly or cobbly loam with surface rock fragments greater than 10% ... F048AY524UT – High Mountain Stony Loam (Engelmann Spruce)
 - b. Surface textures are generally fine sandy loam to gravelly sandy loam with surface rock fragments less than 10%. ... F048AY523UT – High Mountain Stony Loam (Douglas Fir)
 - ii. Rock fragments in the top 24" generally less than 50% by volume

- a. Soil epipedon is generally pachic (mollic and greater than 20" thick) ... F048AY528UT – High Mountain Very Steep Loam (Aspen)
- b. Surface soil texture is coarse (very stony or bouldery) ... F048AY530UT – High Mountain Very Steep Loam (Douglas Fir)
- c. Surface soil texture is finer (loam to fine sandy loam)
 - 1) Rock fragments on the soil surface are generally greater than 15%. ... F048AY532UT – High Mountain Very Steep Stony Loam (Engelmann Spruce)
 - 2) Rock fragments on the soil surface are generally less than 15%. ... F048AY509UT – High Mountain Loam (Douglas-Fir)

III. 16" - 22" annual precipitation (except some south and west slopes or soils with poor water holding capacity), adjacent areas are capable of supporting gambel oak

A. Generally restrictive layer 20" or less from the soil surface

- 1 Surface textures are mostly cobbly loam (rocks 3-10" 10-20% of by volume) ... R048AY442UT – Mountain Shallow Loam (Salina Wildrye)
- 2 Surface textures are mostly channery loam with current or past evidence of trees occupying the site ... R048AY443UT – Mountain Shallow Loam (Mixed Conifer)
- 3 Surface textures are mostly very gravelly loam (gravels 10-30% by volume) ... R048AY433UT – Mountain Shallow Loam (Black Sagebrush)
- 4 Surface textures are mostly gravelly sandy loam with current or past evidence of trees occupying the site ... F048AY439UT – Mountain Shallow Loam (Ponderosa pine)
- 5 Surface textures are loam with Gambel's oak likely the dominant aspect of the site ... R048AY430UT – Mountain Shallow Loam (Oak)
- 6 Surface soil textures are predominately fine sandy loam, but have a gravel modifier as well ... R048AY436UT – Mountain Shallow Loam (Mountain Big Sagebrush)

B. Generally restrictive layer greater than 20" from the soil surface

- 1 Top 24" of soil profile generally contains greater than 50% rock fragments by volume
 - i. Surface soil texture mainly extremely boulder fine sandy loam or very channery loam ... R048AY478UT – Mountain Windswept Ridge
 - ii. Surface soil texture mainly channery/very channery loam with past or present evidence of tree occupying the site ... F048AY452UT – Mountain Stony Loam (Douglas Fir)
 - iii. Surface soil texture mainly loam to very fine sandy loam ... R048AY448UT – Mountain Stony Loam (Mountain Big Sagebrush)
 - iv. Surface soil texture mainly very cobbly very fine sandy loam to stony loam with past or present evidence of trees occupying the site ... F048AY457UT – Mountain Stony Loam (Ponderosa pine)
 - v. Surface soil texture mainly sandy loam to gravelly sandy loam and does not have rock fragments greater than 3" on the soil surface ... R048AY449UT – Mountain Stony Loam (Black sagebrush)
 - vi. Surface soil texture mainly gravelly sandy loam to loam, has less than 10% rock fragments on the soils surface greater than 3" ... R048AY451UT – Mountain Stony Loam (Shrub)
 - vii. Surface soil textures mainly extremely stony loam to extremely boulder fine sandy loam with slopes typically greater than 50% and past/present evidence of trees occupying the site ... F048AY475UT – Mountain Very Steep Stony Loam (Douglas Fir)
 - viii. Surface soil textures mainly gravelly sandy loam with slopes generally greater than 50% ... R048AY473UT – Mountain Very Steep Stony Loam (Shrub)

2 Top 24" of soil profile generally contains less than 50% rock fragments by volume

- i. Slopes on site typically greater than 50%
 - a. Surface soil texture sandy loam with past/present evidence of trees occupying the site ... F048AY463UT – Mountain Very Steep Loam (Douglas Fir)
 - b. Surface soil textures mainly stony/extremely stony loam, to very channery loam ... R048AY466UT – Mountain Very Steep Loam (Salina Wildrye)

d. Surface soil textures are mainly very channery loam and rock fragment on the soil surface is larger than 3" ... R048AY471UT – Mountain Very Steep Loam (Curlleaf mountainmahogany)

c. Surface soil textures mainly fine sandy loam to loam with past/present evidence of Gambel's oak on the site ... R048AY465UT – Mountain Very Steep Loam (Oak)

ii. Slopes on site typically less than 50%

a. Site occurs in area that receive additional moisture from adjacent upland sites ... R048AY410UT – Mountain Loamy Bottom (Basin Wildrye)

b. Site not as above

1) Present or past evidence that trees dominated this site ... R048AY417UT – Mountain Loam (Ponderosa Pine)

2) Surface soil texture mainly loam to stony loam with the past/present evidence of Gambel's oak as the dominant aspect of the site ... R048AY415UT – Mountain Loam (Oak)

3) Surface soil texture mainly stony to clay loam with the dominant aspect of the site being a grass ... R048AY409UT – Mountain Loam (Salina Wildrye)

4) Surface soil texture mainly gravelly fine sandy loam ... R048AY406UT – Mountain Loam (Shrub)

5) Surface soil texture mainly loam, fine sandy loam to cobbly fine sandy loam ... R048AY405UT – Mountain Loam (Mountain Big Sagebrush)

IV. 12" - 16" annual precipitation. Up to 20" on south and west slopes or soils with poor water holding capacity, site is too dry to support gambel oak

A. Generally restrictive layer 20" or less from the soil surface

1 Surface textures are mostly clay loam ... R048AY315UT – Upland Clay Loam (Utah Juniper-Pinyon)

2 Surface textures are mostly channery or gravelly sandy loam (surface fragments 10-30% by volume) ... R048AY320UT – Upland Shallow Loam (Black sagebrush)

3 Surface textures are mostly very channery loam (surface fragments 10-30% by volume) ... R048AY322UT – Upland Shallow Loam (Two-Needle Pinyon / Utah Juniper)

9 Surface textures are mostly very channery loam and rock content in the top 24" is greater than 35% by volume. ... F048AY330UT – Upland Shallow Stony Loam (Two-Needle Pinyon /Douglas Fir)

8 Surface soil textures are fine gravelly silty clay loam to gravelly loam and rock content is generally less than 35% of the soil volume ... R048AY309UT – Upland Loam (Birchleaf Mountain Mahogany)

6 Surface soil textures are predominately gravelly loam on outwash terraces (surface fragments 10-30%). ... R048AY323UT – Upland Shallow Hardpan (Black Sagebrush)

7 Surface soil texture mainly very channery loam (surface fragments 20-70%) with slopes greater than 35%. ... R048AY366UT – Upland Very Steep Loam (Salina Wildrye)

4 Surface textures are mostly gravelly fine sandy loam (surface fragments 10-40% by volume) ... R048AY332UT – Upland Shallow Stony Loam (Bonneville Big Sagebrush)

5 Surface textures are channery loam with slopes greater than 35% ... R048AY342UT – Upland Very Steep Shallow Loam (Pinyon-Utah Juniper)

B. Generally restrictive layer greater than 20" from the soil surface

1 Top 24" of soil profile generally contains greater than 35% rock fragments by volume

i. Surface soil texture mainly channery/extremely channery loam (surface fragments 10-60%). ... R048AY331UT – Upland Stony Loam (Pinyon-Utah Juniper)

ii. Surface soil texture mainly channery or bouldery sandy loam (surface fragments greater than 35%). ... R048AY334UT – Upland Stony Loam (basin big sagebrush-saline wildrye)

2 Top 24" of soil profile generally contains less than 35% rock fragments by volume

i. Surface soil texture mainly channery fine sandy loam (surface fragments 10-30%). ... R048AY311UT – Upland Gravelly Loam (Bonneville Big Sagebrush)

ii. Surface soil texture mainly loamy sand are excessively drained on alluvial fans ... R048AY312UT –

Upland Sand (Basin big sagebrush)

iii. Surface soil texture mainly loam, may have a gravelly modifier, has less than 10% rock fragments on the soils surface ... R048AY306UT – Upland Loam (Wyoming Big Sagebrush)

iv. Surface soil texture mainly loam to silty clay loam, may have a gravelly modifier, has less than 10% rock fragments on the soils surface ... R048AY308UT – Upland Loam (Bonneville Big Sagebrush)

MLRA 48A Wyoming

I. Precipitation is 16-20 inches; site has no water table or receives run-in moisture; family particle size is fine-loamy; surface texture is loam, clay loam, sandy clay loam or gravelly loam ... R048AY122WY – Mountain Loam

II. Site not as above ... Key 1 – MLRA 48A Colorado