

# Ecological site group ESG048A27

## Shallow

Last updated: 06/01/2022  
Accessed: 07/13/2024

---

### Key Characteristics

- Uplands
- <75% bedrock outcrop
- Surface SAR <8, or Subsurface EC <8, or Surface EC <4
- Gypsum <5% surface and <10% subsurface
- EC <1.5 surface or <2 subsurface
- slope <35% or <40% surface rock
- depth: 30-55cm - 717 soil components
- Uplands
- <75% bedrock outcrop
- Gypsum <5% surface, gypsum <10% subsurface, surface SAR <8, subsurface EC <8, and surface EC <4.
- EC<1.5 surface or <2 subsurface
- Depth: 30-55 cm AND soil moisture regime of Udic or Ustic - 694 soil components

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.

### Physiography

This ESG is located on mountain slopes and hills.

### Soil features

This ESG is characterized by depth 30-55cm.

### Vegetation dynamics

The modal ecological site for this ESG is F048AY918CO - Spruce-Fir Woodland.

### Major Land Resource Area

MLRA 048A  
Southern Rocky Mountains

### Subclasses

- F048AY439UT–Mountain Shallow Loam (Ponderosa pine)
- F048AY448CO–Mountain Pinyon
- F048AY449CO–Aspen Woodland
- F048AY452UT–Mountain Stony Loam (Douglas Fir)
- F048AY475UT–Mountain Very Steep Stony Loam (Douglas Fir)
- F048AY506UT–High Mountain Loam (Aspen)
- F048AY523UT–High Mountain Stony Loam (Douglas Fir)
- F048AY530UT–High Mountain Very Steep Loam (Douglas Fir)
- F048AY908CO–Mixed Conifer

- F048AY912CO–Lodgepole Pine
- F048AY917CO–Abies lasiocarpa/Paxistima myrsinites/Erigeron eximius
- F048AY918CO–Spruce-Fir Woodland
- F048AY921CO–White Fir/Snowberry
- F048AY924CO–Douglas Fir/Gambel Oak
- F048AY925CO–Ponderosa Pine Forest
- R048AA228CO–Mountain Loam Gunnison Basin LRU
- R048AA247CO–Deep Clay Loam Shale Highlands LRU
- R048AA250CO–Subalpine Loam Gunnison Basin LRU
- R048AY002NM–Mountain Grassland
- R048AY004NM–Mountain Loam
- R048AY005NM–Mountain Malpais
- R048AY006NM–Mountain Meadow
- R048AY007NM–Mountain Shale
- R048AY013NM–Mountain Slopes
- R048AY122WY–Mountain Loam
- R048AY222CO–Loamy Park
- R048AY228CO–Mountain Loam
- R048AY229CO–Rocky Loam
- R048AY230CO–Shallow Loam
- R048AY235CO–Dry Exposure
- R048AY237CO–Stony Loam
- R048AY238CO–Brushy Loam
- R048AY241CO–Mountain Meadow
- R048AY242CO–Dry Mountain Shale
- R048AY244CO–Mountain Shale
- R048AY247CO–Deep Clay Loam
- R048AY248CO–Mountain Clay Loam
- R048AY250CO–Subalpine Loam
- R048AY251CO–Shallow Subalpine
- R048AY252CO–Subalpine Clay
- R048AY253CO–Wet Subalpine
- R048AY255CO–Pine Grasslands
- R048AY287CO–Stony Foothills
- R048AY303CO–Loamy Slopes
- R048AY304CO–Alpine Slopes
- R048AY305CO–Alpine Meadow
- R048AY306CO–Shrubby Alpine
- R048AY306UT–Upland Loam (Wyoming Big Sagebrush)
- R048AY308CO–Shallow Alpine
- R048AY315UT–Upland Clay Loam (Utah Juniper-Pinyon)
- R048AY331UT–Upland Stony Loam (Pinyon-Utah Juniper)
- R048AY366UT–Upland Very Steep Loam (Salina Wildrye)
- R048AY409UT–Mountain Loam (Salina Wildrye)
- R048AY415UT–Mountain Loam (Oak)
- R048AY417UT–Mountain Loam (Ponderosa Pine)
- R048AY448UT–Mountain Stony Loam (Mountain Big Sagebrush)
- R048AY451UT–Mountain Stony Loam (Shrub)
- R048AY466UT–Mountain Very Steep Loam (Salina Wildrye)
- R048AY473UT–Mountain Very Steep Stony Loam (Shrub)
- R048AY515UT–High Mountain Loam (Thurber Fescue)

### **Correlated Map Unit Components**

20976216, 20976182, 20984876, 20985581, 20985574, 20985883, 20985899, 20985947, 20985980, 20986040, 20985866, 20985803, 20987341, 20987343, 20987092, 20987309, 20987176, 20987395, 20987124, 20988190, 21054023, 21070355, 20992000, 20991980, 20992003, 20992039, 20992053, 20992071, 20992076, 20992085, 20992099, 20992105, 20991984, 20993637, 20993498, 20993461, 20993604, 20993569, 20993456, 20993515,

20993529, 20993546, 20993621, 20993831, 20993675, 20994085, 20994315, 20994297, 20994612, 20994341, 20994638, 20995006, 20994998, 20995013, 20995024, 20995053, 20995070, 20995047, 20995138, 20995153, 20995160, 21057170, 21057031, 21057039, 21057044, 21057053, 21057335, 21057344, 21057349, 21057360, 21057543, 21057792, 21232293, 21232320, 21232279, 21232275, 21287068, 21287129, 21287128, 21287112, 21287152, 21287135, 21287156, 21287143, 21287114, 21287137, 21286199, 21286234, 21286239, 21286249, 21286273, 21286296, 21286281, 21286409, 21286433, 21286392, 21286420, 21286492, 21286514, 21285919, 21285921, 21285795, 21285816, 21285847, 21285827, 21285862, 21285875, 21285972, 21286003, 21286030, 21286028, 21285275, 21285276, 21285290, 21285268, 21285329, 21285338, 21285335, 21285343, 21285396, 21285458, 21285470, 21285472, 21285477, 21285482, 21285194, 21285180, 21285179, 21285181, 21285236, 21285243, 21285247, 21285218, 21285165, 21285229, 21285078, 21285079, 21285102, 21285104, 21284837, 21285072, 21284930, 21284925, 21284986, 21285001, 21284937, 21284844, 21284863, 21284857, 21284904, 21284881, 21284944, 21284972, 21284352, 21284353, 21284373, 21284329, 21284237, 21284289, 21284294, 21284403, 21284360, 21262213, 21262231, 21262225, 21262216, 21262272, 21262234, 21262371, 21262324, 21262326, 21262328, 21262349, 21262456, 21262356, 21262395, 21262399, 21262422, 21262426, 21262424, 21262404, 21281887, 21281934, 21256071, 21256053, 21256059, 21256101, 21256077, 21256049, 21256126, 21256127, 21256162, 21256151, 21256145, 21256186, 21256188, 21256096, 21256095, 21256130, 21256132, 21256128, 21256134, 21256192, 21256200, 21256177, 21256195, 21256180, 21256167, 21256227, 21256228, 21256226, 21256232, 21256263, 21256259, 21256266, 21256212, 21256214, 21256213, 21256252, 21256304, 21256240, 21256272, 21256241, 21256307, 21256405, 21256338, 21256343, 21256463, 21256325, 21256380, 21256316, 21256385, 21256411, 21256415, 21256423, 21256390, 21256398, 21256392, 21256474, 21256428, 21256061, 21664062, 21664065, 21664235, 21663974, 21664081, 21663999, 21664001, 21664243, 21664016, 21664021, 21664022, 21664175, 21663948, 21664102, 21664108, 21664030, 21663957, 21664180, 21663958, 21664207, 21664193, 21664205, 21276851, 21276817, 21276841, 21276822, 21276883, 21276887, 21276704, 21276764, 21276736, 21276803, 21276809, 21276740, 21272831, 21272857, 21272855, 21272863, 21272907, 21272994, 21273000, 21273012, 21273070, 21273075, 21273050, 21271125, 21270945, 21131209, 21131212, 21131242, 21131384, 21131361, 21131365, 21251020, 21251894, 21251342, 21251277, 21251246, 21251786, 21251281, 21251282, 21251317, 21251775, 21251868, 21251791, 21251443, 21251445, 21251916, 21251346, 21251418, 21251454, 21251482, 21251732, 21251686, 21251720, 21251723, 21251753, 21251708, 21251808, 21251839, 21250617, 21250658, 21250741, 21245544, 21245630, 21245676, 21245679, 21245885, 21245888, 21245990, 21246001, 21245330, 21245334, 21245335, 21245343, 21245357, 21245388, 21245389, 21245394, 21245456, 21245472, 21245474, 21245476, 21245503, 21245477, 21245486, 21268192, 21268287, 21268239, 21264943, 21264950, 21264960, 21265018, 21265403, 21244766, 21244772, 21244775, 21244798, 21244847, 21244959, 21244951, 21244884, 21244931, 21244933, 21244938, 21243260, 21243367, 21243244, 21243255, 21243275, 21243256, 21243270, 21243283, 21243342, 21243355, 21243311, 21243312, 21269399, 21269483, 21269408, 21269507, 21269405, 21269516, 21269389, 21269551, 21269885, 21269755, 21269729, 21269572, 21269571, 21269809, 21269812, 21269765, 21269793, 21269792, 21269880, 21269707, 21269921, 21269991, 21269954, 21270024, 21270023, 21269983, 21270019, 21270094, 21270222, 21270069, 21269904, 21270286, 21269940, 21270321, 21270627, 21270373, 21270641, 21270547, 21270579, 21270672, 21270502, 21270304, 21270303, 21270454, 21270384, 21270383, 21270497, 21270346, 21270318, 21242896, 21243178, 21242887, 21242999, 21242957, 21242982, 21243016, 21242993, 21242994, 21243006, 21243038, 21243036, 21243010, 21243022, 21243024, 21243077, 21243079, 21243081, 21243080, 21243071, 21243082, 21243083, 21242106, 21241200, 21241287, 21241241, 21241467, 21241539, 21240956, 21835797, 21835805, 21835806, 21835937, 21835829, 21836100, 21835857, 21836128, 21835902, 21835893, 21836166, 21833060, 21832912, 21840287, 21840404, 21840407, 21840228, 21840227, 21840143, 21840164, 21840165, 21834894, 21835542, 21835549, 21835299, 21835573, 21835180, 21835360, 21835510, 21842363, 21842197, 21842281, 21842305, 21842207, 21841870, 21842068, 21841729, 21841734, 21978876, 21978480, 21978455, 21978397, 21978556, 21978413, 21979227, 21979247, 21979267, 21979292, 21979296, 21979295, 21979301, 21979298, 21979316, 21979323, 21979334, 21979337, 21979349, 21979353, 21979376, 21979389, 21979407, 21979414, 21979418, 21979424, 21979429, 21979432, 21979435, 21979441, 21979452, 21979464, 21979471, 21979474, 21979472, 21978882, 21979559, 21979563, 21979808, 21979156, 21979073, 21979533, 21979836, 21979530, 21980090, 21980095, 21980098, 21980121, 21980217, 21980223, 21980245, 21980283, 21980326, 21980330, 21980338, 21980344, 21980345, 21980356, 21980359, 21980385, 21980388, 21980389, 21980413, 21980498, 21980527, 21980532, 21980571, 21980590, 21980592, 21981975, 21981973, 21980792, 21981959, 21981957, 21980859, 21980870, 21980969, 21981048, 21981069, 21981826, 21981951, 21981810, 21981811, 21981990, 21981085, 21979886, 21981108, 21981107, 21982015, 21981237, 21981240, 21981479, 21981527, 21982022, 21981606, 21840753, 21841251, 21841001, 21841084, 21841307, 21842789, 21842680, 21842608, 21842665, 21408058, 21408066, 21407187, 21407821, 21406953, 21407761, 21407770, 21407409, 21407854, 21407666, 21407728, 21421274, 21421464, 21421460, 21421497, 21421484, 21421545, 21421547, 21421666, 21421764, 21825948, 21502959,

21490226, 21490582, 21490085, 21490113, 21490112, 21490118, 21490092, 21820179, 21820330, 21820353, 21820356, 21820369, 21820425, 21820438, 21820465, 21820498, 21819898, 21819911, 21866209, 21865936, 21865911, 21866170, 21866714, 21866675, 21866263, 21866150, 21866148, 21865900, 21865896, 21865977, 21865974, 21866403, 21866377, 21866382, 21866385, 21866533, 21866840, 21866471, 21866638, 21866686, 21866694, 21865689, 21865917, 21865984, 21865991, 21865992, 21866582, 21910888, 21910890, 21910900, 21910923, 21910931, 21910938, 21910941, 21910951, 21910953, 21910960, 21910962, 21910966, 21910986, 21910990, 21910999, 21911009, 21911033, 21910650, 21910652, 21910658, 21910660, 21910788, 21910793, 21910810, 21910812, 21910837, 21910869, 21910706, 21910708, 21910710

## Stage

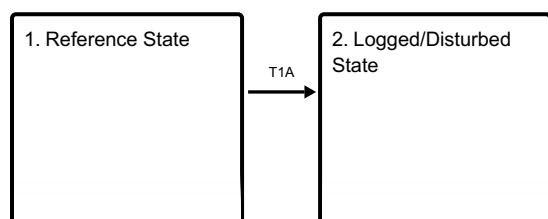
Provisional

## Contributors

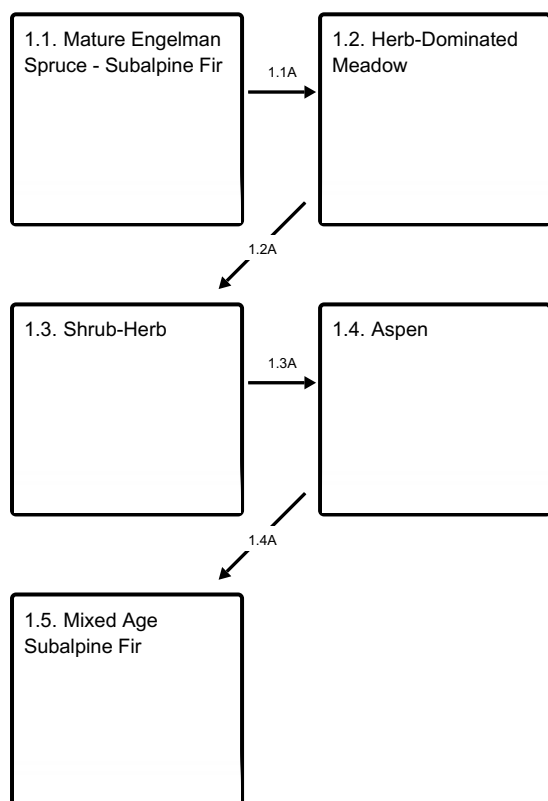
Travis Nauman

## State and transition model

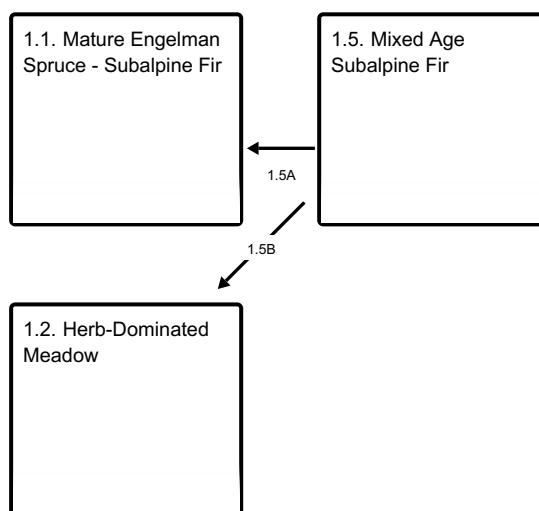
### Ecosystem states



### State 1 submodel, plant communities



### Communities 1, 5 and 2 (additional pathways)



## State 1 Reference State

The Reference State is a description of this ecological site just prior to Euro-American settlement but long after the arrival of Native Americans. At the time of European colonization, what would have been observed on these sites would have primarily depended on the time elapsed since the last wildfire occurred. Had the site been relatively undisturbed (i.e. without fire) for approximately 400 years or longer, the late seral climax of Subalpine fir and

Engelmann spruce co-dominant forest would have been found (1.1). The understory would have been relatively sparse due to tree competition, overstory shading, and duff accumulation. Wildfire (1.1a) would have replaced these stands with diverse herb-dominated vegetation (1.2). In the absence of any major disturbance (1.2a, 1.3a, 1.4a, 1.5a), the vegetation would have progressed into more of a shrub-herb co-dominance (1.3), followed by aspen (*Populus tremuloides*) and possibly lodgepole pine (*Pinus contorta*) (1.4), then would have become a mature stand of subalpine fir (*Abies lasiocarpa*) (1.5). Ultimately the site would have been reinvaded by Engelmann spruce (1.1). Wildfire (1.1a, 1.5b) would have been the primary disturbance factor prior to colonization. Livestock grazing and fire exclusion can accelerate natural succession of woody species.

### **Community 1.1**

#### **Mature Engelmann Spruce - Subalpine Fir**

Subalpine fir and Engelmann spruce co-dominant the climax overstory; few stands exhibit Engelmann spruce dominance over subalpine fir. Douglas fir and aspen occur as seral trees in some stands. The understory would be sparse consisting of shade-tolerant herbs such as heartleaf arnica, Geyer's sedge, slender wheatgrass, and spike trisetum. This community would have existed approximately 400 years post fire.

### **Community 1.2**

#### **Herb-Dominated Meadow**

This plant community will develop within the first 5 years following the last fire or complete tree removal. This would have been dominated by shade-intolerant forbs and grasses.

### **Community 1.3**

#### **Shrub-Herb**

Between 5 and 30 years after fire, shrubs and herbs would co-dominant the site. The increasing shrub component would have included common juniper (*Juniperus communis*), grouse whortleberry (*Vaccinium scoparium*), gooseberry currant (*Ribes montigenum*), and Oregon boxleaf (*Paxistima myrsinites*). Geyer's sedge, spike trisetum, heartleaf arnica, and meadow-rue would have been beginning to be present in the understory.

### **Community 1.4**

#### **Aspen**

This plant community would have been dominated by aspen, a seral species. Understories are forb-rich beneath early successional aspen canopies. Subalpine fir would have been present only as an understory species at this time. Aspen would have dominated these sites for approximately 30 to 100 years following the last fire. The understory would have had a mixture of shrubs and herbaceous species. Lodgepole pine may become established following aspen. Lodgepole pine may occur as an important seral species up toward Leadville and Denver.

### **Community 1.5**

#### **Mixed Age Subalpine Fir**

A stand of mature aspen and/or lodgepole pine with an inter-mixing of subalpine fir, and Engelmann spruce will develop approximately 100 to 400 years following fire or complete tree removal. Only shade-tolerant understory species would have been present. During this time, Engelmann spruce would become established in the understory.

### **Pathway 1.1A**

#### **Community 1.1 to 1.2**

A stand-replacing wildfire or intensive logging will set the vegetation back to an early seral herb-dominated phase. Logging opens the forest canopy, allowing shrubs and herbs to flourish for 20 to 30 years.

### **Pathway 1.2A**

#### **Community 1.2 to 1.3**

After about 5 years, shrubs will establish, and the understory will diminish due to natural succession. Heavy

season-long livestock grazing will accelerate woody plant recovery and diminish the understory.

### **Pathway 1.3A** **Community 1.3 to 1.4**

Woody plant recovery continue to occur due to natural succession. Heavy season-long sheep grazing, deer and elk grazing, and fire exclusion will accelerate woody plant recovery and diminish the understory. About 30 years after fire, aspen would have become established in the site.

### **Pathway 1.4A** **Community 1.4 to 1.5**

With approximately another century without fire, subalpine fir would have out competed the aspen to become the dominant overstory species at the site. Heavy season-long livestock grazing, and fire exclusion will accelerate woody plant recovery and diminish the understory.

### **Pathway 1.5A** **Community 1.5 to 1.1**

After approximately 400 years following the last wildfire, Engelmann spruce would have out-competed subalpine fir to become the dominant overstory species at the site. Fire exclusion will accelerate woody plant recovery and diminish the understory.

### **Pathway 1.5B** **Community 1.5 to 1.2**

A stand-replacing wildfire or intensive logging will set the vegetation back to an early seral shade-intolerant herb-dominated phase. Logging opens up the forest canopy allowing shrubs and herbs to flourish for 20 to 30 years.

## **State 2** **Logged/Disturbed State**

This state is forest plantation with trees like lodgepole pine planted specifically to replace previously degraded forests and to increase productivity of the site for economic profitability. Subsequent harvests and replanting will take place at maximum wood accumulation. Thinning to reduce insect or pathogen outbreaks will help maintain the resiliency of this State. Conversely, no management action may reduce the resiliency of this State. With the large spruce trees being targeted during the first rounds of logging, what was left of these trees was minimal to none. Instead, sites that would have been dominated by Engelmann spruce became more often dominated by subalpine fir with only a scattering of Engelmann spruce (1.1). Logging effects, along with associated mechanical and fire disturbances, open the canopy and allow for the expansion of the herbaceous understory

## **Transition T1A** **State 1 to 2**

Sites that have had the most intense logging pressure have also had greatest degree of forest soil erosion and soil compaction. Once the forest reaches a certain level of degradation, managers often decide to focus on favoring one tree, usually lodgepole pine because of its greater growth rate and merchantability. This requires a clear cut and slash disposal followed by planting. A less costly alternative compared to logging/slashing/replanting is to defer logging and control livestock grazing to allow whatever self-regenerating trees that occur on the site to recover. This process could, however, be thwarted by heavy game usage (i.e. elk utilization of aspen, or snowshoe hare utilization of subalpine fir).

## **Citations**