

Ecological site group ESG048A26

Very Shallow

Last updated: 06/01/2022
Accessed: 04/25/2024

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 <30cm - 1211 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 cm AND soil moisture regime of Udic or Ustic - 1170 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 <30cm.

Vegetation dynamics

The modal ecological site for this ESG is F048AY908CO - Mixed Conifer.

Major Land Resource Area

MLRA 048A
Southern Rocky Mountains

Subclasses

- F048AY330UT–Upland Shallow Stony Loam (Two-Needle Pinyon /Douglas Fir)
- F048AY439UT–Mountain Shallow Loam (Ponderosa pine)
- F048AY448CO–Mountain Pinyon
- F048AY449CO–Aspen Woodland
- F048AY452UT–Mountain Stony Loam (Douglas Fir)
- F048AY457UT–Mountain Stony Loam (Ponderosa pine)
- F048AY463UT–Mountain Very Steep Loam (Douglas Fir)
- F048AY475UT–Mountain Very Steep Stony Loam (Douglas Fir)
- F048AY523UT–High Mountain Stony Loam (Douglas Fir)

- F048AY908CO–Mixed Conifer
- F048AY912CO–Lodgepole Pine
- F048AY917CO–Abies lasiocarpa/Paxistima myrsinites/Erigeron eximius
- F048AY918CO–Spruce-Fir Woodland
- F048AY924CO–Douglas Fir/Gambel Oak
- F048AY925CO–Ponderosa Pine Forest
- R048AA228CO–Mountain Loam Gunnison Basin LRU
- R048AA235CO–Dry Exposure Gunnison Basin LRU
- R048AY001NM–Subalpine Grassland
- R048AY004NM–Mountain Loam
- R048AY005NM–Mountain Malpais
- R048AY006NM–Mountain Meadow
- R048AY007NM–Mountain Shale
- R048AY008NM–Mountain Brush
- R048AY008UT–Wet Fresh Meadow (Willow-Sedge)
- R048AY010NM–Pine Grassland
- R048AY013NM–Mountain Slopes
- R048AY015NM–Mountain Shale Dry
- R048AY122WY–Mountain Loam
- R048AY218CO–Dry Shallow Pine
- R048AY222CO–Loamy Park
- R048AY226CO–Mountain Loam 13-18 PZ Westcliffe Area
- R048AY228CO–Mountain Loam
- R048AY229CO–Rocky Loam
- R048AY230CO–Shallow Loam
- R048AY231CO–Dry Mountain Loam
- R048AY235CO–Dry Exposure
- R048AY237CO–Stony Loam
- R048AY238CO–Brushy Loam
- R048AY240CO–Shallow Pine
- R048AY241CO–Mountain Meadow
- R048AY244CO–Mountain Shale
- R048AY247CO–Deep Clay Loam
- R048AY248CO–Mountain Clay Loam
- R048AY250CO–Subalpine Loam
- R048AY251CO–Shallow Subalpine
- R048AY252CO–Subalpine Clay
- R048AY255CO–Pine Grasslands
- R048AY287CO–Stony Foothills
- R048AY303CO–Loamy Slopes
- R048AY304CO–Alpine Slopes
- R048AY306CO–Shrubby Alpine
- R048AY308CO–Shallow Alpine
- R048AY309CO–Warm Alpine
- R048AY311UT–Upland Gravelly Loam (Bonneville Big Sagebrush)
- R048AY315UT–Upland Clay Loam (Utah Juniper-Pinyon)
- R048AY320UT–Upland Shallow Loam (Black sagebrush)
- R048AY322UT–Upland Shallow Loam (Two-Needle Pinyon / Utah Juniper)
- R048AY323UT–Upland Shallow Hardpan (Black Sagebrush)
- R048AY342UT–Upland Very Steep Shallow Loam (Pinyon-Utah Juniper)
- R048AY379CO–Brushy Slopes
- R048AY405UT–Mountain Loam (Mountain Big Sagebrush)
- R048AY406UT–Mountain Loam (Shrub)
- R048AY415UT–Mountain Loam (Oak)
- R048AY430UT–Mountain Shallow Loam (Oak)
- R048AY436UT–Mountain Shallow Loam (Mountain Big Sagebrush)
- R048AY443UT–Mountain Shallow Loam (Mixed Conifer)
- R048AY451UT–Mountain Stony Loam (Shrub)

- R048AY466UT–Mountain Very Steep Loam (Salina Wildrye)
- R048AY473UT–Mountain Very Steep Stony Loam (Shrub)
- R048AY478UT–Mountain Windswept Ridge

Correlated Map Unit Components

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Stage

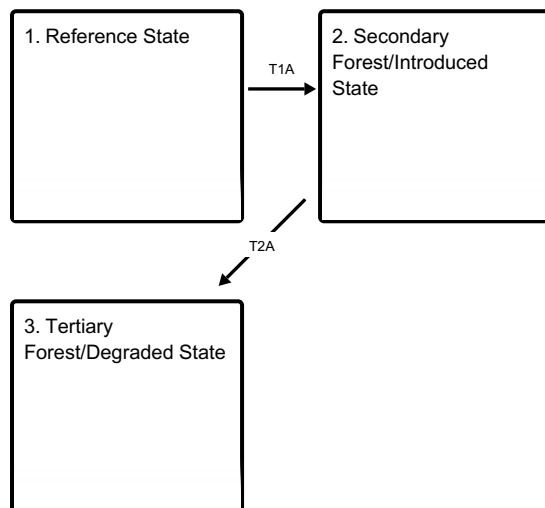
Provisional

Contributors

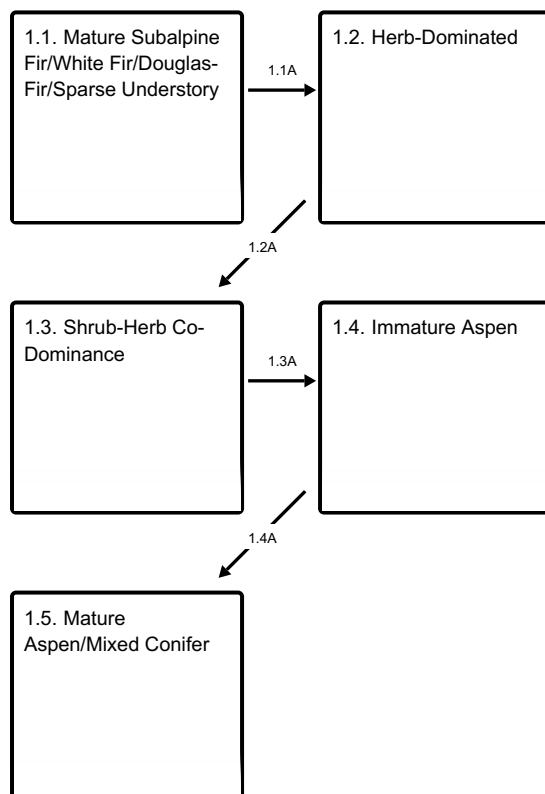
Travis Nauman

State and transition model

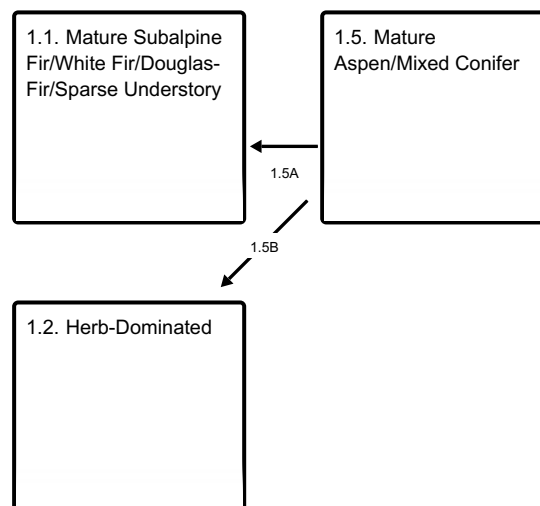
Ecosystem states



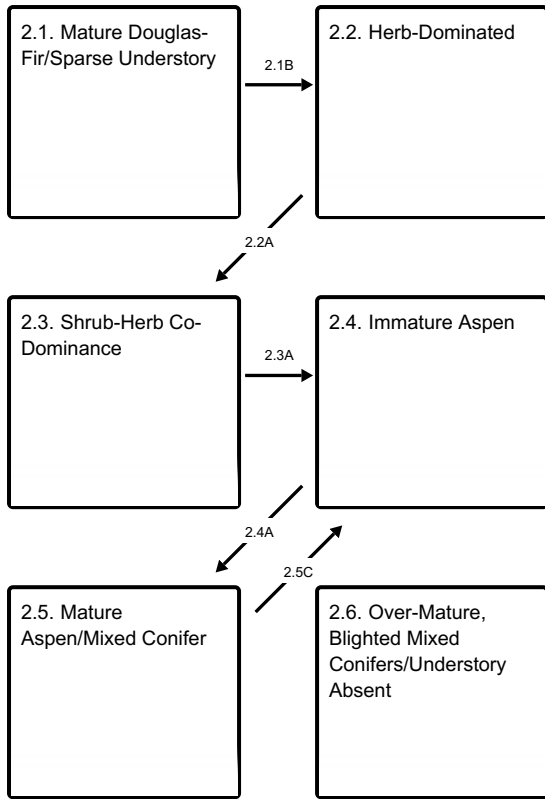
State 1 submodel, plant communities



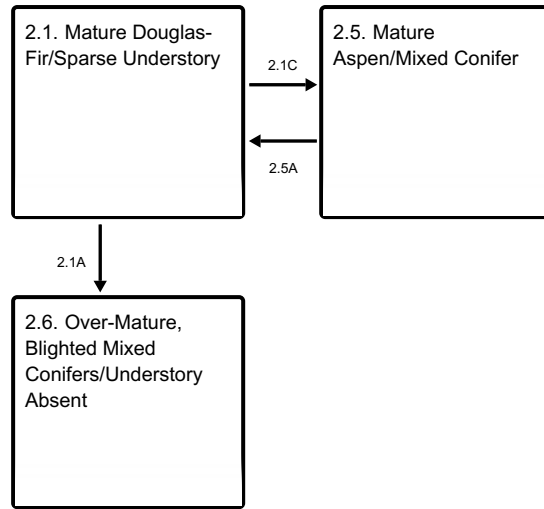
Communities 1, 5 and 2 (additional pathways)



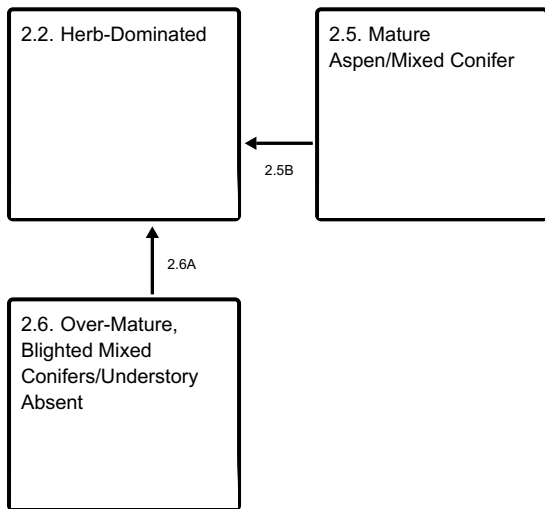
State 2 submodel, plant communities



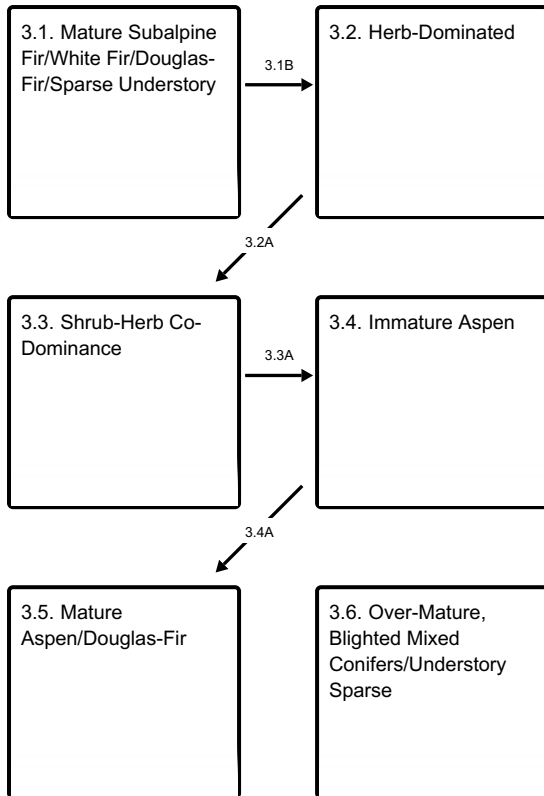
Communities 1, 5 and 6 (additional pathways)



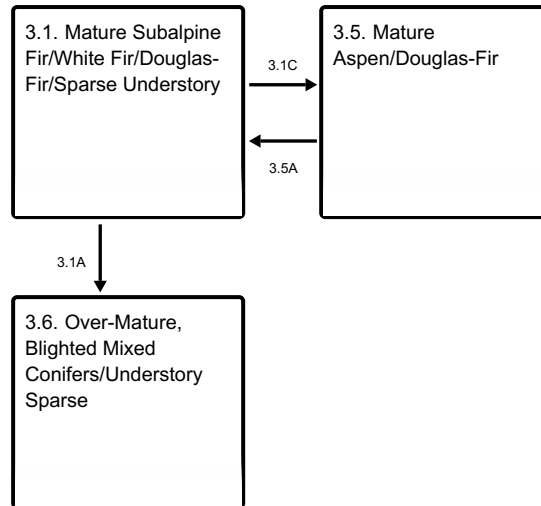
Communities 2, 5 and 6 (additional pathways)



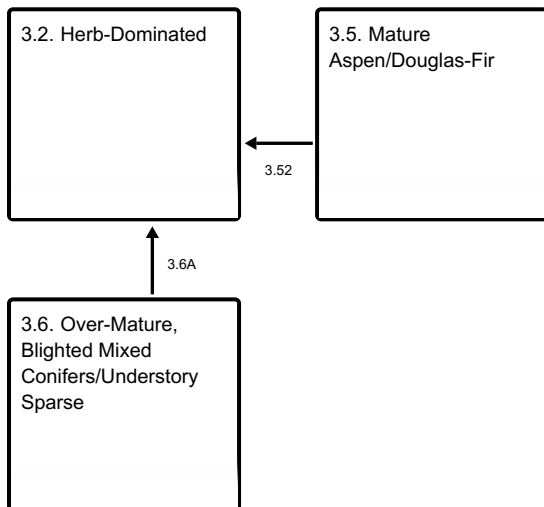
State 3 submodel, plant communities



Communities 1, 5 and 6 (additional pathways)



Communities 2, 5 and 6 (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. The description of the Reference State was determined by NRCS Soil Survey Type Site Location information and familiarity with relict areas where they exist. At the time of European colonization, what would have been observed on these sites would have primarily depended on the time since the last wildfire occurred. If fire had not occurred for about 100 years, a stand of mixed conifers including subalpine fir (*Abies lasiocarpa*), Douglas-fir (*Pseudotsuga menziesii*), and white fir (*Abies concolor*) would have been the dominant species occupying the site (1.1). The particular tree dominants would also sort out based on aspect exposure (Alexander 1985, 1988). The understory would have been relatively sparse under mature trees due to tree competition, overstory shading, and duff accumulation. Wildfire or insect outbreaks on particular tree species (1.1a) would have replaced these stands with a rich diversity of 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 the increasing presence of aspen (*Populus tremuloides*) first as seedlings and saplings (1.4), and later as mature aspen with mixed conifer seedlings (1.5). Ultimately the conifers would have outcompeted aspen, returning the climax vegetation (1.1). Wildfire (1.1a, 1.5b) would have been the primary

disturbance factor prior to colonization, although periodic outbreaks of insects destroying particular tree species could reset the successional clock. Early successional stages were shorter in duration.

Community 1.1

Mature Subalpine Fir/White Fir/Douglas-Fir/Sparse Understory

This plant community (1.1) would have been characterized by a stand of mature mixed conifers including subalpine fir, Douglas-fir, and white fir, with a sparse understory of Geyer's sedge (*Carex geyeri*), slender wheatgrass (*Elymus trachycaulus*), and heartleaf arnica (*Arnica cordifolia*).

Community 1.2

Herb-Dominated

This plant community would have developed within the first 5 years following fire. Geyer's sedge, slender wheatgrass, and heartleaf arnica would have been the dominant species, along with many other short-lived herbaceous shade-intolerant species.

Community 1.3

Shrub-Herb Co-Dominance

Between 5 and 60 years after fire, shrubs and herbs would co-dominate the site. The increasing shrub component would have included mountain snowberry (*Symphoricarpos oreophilus*), creeping barberry (*Mahonia repens*), mallow ninebark (*Physocarpus malvaceus*), and gooseberry currant (*Ribes montigenum*), among others.

Community 1.4

Immature Aspen

This plant community would have been dominated by a stand of immature aspen, a seral species, while the conifer species would have begun to establish themselves under other nurse plants. A stand of immature aspen would have existed approximately 60 to 80 years following the last fire.

Community 1.5

Mature Aspen/Mixed Conifer

A stand of mature aspen intermixed with mixed conifers and various understory shrubs would have been encountered approximately 80 to 100 years post fire.

Pathway 1.1A

Community 1.1 to 1.2

Wildfire would have removed the trees, allowing shade-intolerant herbs to flourish briefly.

Pathway 1.2A

Community 1.2 to 1.3

After about 5 years, shrubs would begin to establish in the site.

Pathway 1.3A

Community 1.3 to 1.4

About 60 years after fire, aspen would have become established in the site.

Pathway 1.4A

Community 1.4 to 1.5

Aspen would have continued to mature while the various conifers would have become well established in the understory.

Pathway 1.5A

Community 1.5 to 1.1

After about 100 years following the last fire, the conifers would become mature, shading out aspen and the shade-intolerant shrub and herb species in the understory.

Pathway 1.5B

Community 1.5 to 1.2

Wildfire would have removed the trees, allowing shade-intolerant herbs to flourish briefly.

State 2

Secondary Forest/Introduced State

State 2 is similar to State 1 in form and function, with the exception of the presence of non-native plants and animals, possible extinctions of native species, a different climate, and a secondary stand of trees. State 2 is a description of the ecological site following Euro-American settlement. This state can be regarded as the current potential. With the least amount of disturbance or manipulation of the fire regime, a mature stand of subalpine fir, white fir, and Douglas fir with a sparse understory component is expected at this site (2.1). As with the Reference State, time since last wildfire remains the key factor in determining what vegetation will be encountered on these sites. Wildfire, particularly crown fires, or complete harvesting of the forest (2.1b, 2.5b, 2.6a) will replace these stands with a rich diversity of herb-dominated vegetation. (2.2). In the absence of any major disturbance (2.2a, 2.3a, 2.4a, 2.5a), the vegetation will progress into more of a shrub-herb co-dominance (2.3), followed by the increasing presence of aspen, first as seedlings and saplings (2.4), and later as mature aspen with immature conifers (2.5). Ultimately the conifers will outcompete aspen, returning to a semblance of climax vegetation (2.1). In some areas where wildfire has been prevented, the conifers may become over-mature (2.6) and consequently are more susceptible to infestation by insects and pathogens (2.1a). The resiliency of this State can be maintained by moderating human uses of the forest for timber and/or grazing.

Community 2.1

Mature Douglas-Fir/Sparse Understory

This plant community (2.1) is characterized by a stand of mature subalpine fir, white fir, and Douglas-fir. A sparse understory of Geyer's sedge, slender wheatgrass, and heartleaf arnica may be present.

Community 2.2

Herb-Dominated

This plant community will develop within the first 5 years following the last fire or complete tree removal. Geyer's sedge, slender wheatgrass, and heartleaf arnica will be the dominant understory species. A small component of introduced species may be present.

Community 2.3

Shrub-Herb Co-Dominance

A plant community co-dominated by shrubs and herbs will develop approximately 5 to 60 years following fire or complete tree removal. A small component of introduced species may be present.

Community 2.4

Immature Aspen

Aspen will establish in the site 60 to 80 years after the last fire or complete tree removal.

Community 2.5

Mature Aspen/Mixed Conifer

A stand of mature aspen with an intermixed with subalpine fir, white fir, and Douglas-fir will develop approximately 80 to 100 years following fire or complete tree removal.

Community 2.6

Over-Mature, Blighted Mixed Conifers/Understory Absent

This plant community is the result of fire exclusion for well over 100 years. The Douglas-fir is over-mature and weakened, making it susceptible to infestation by insects or other pathogens.

Pathway 2.1B

Community 2.1 to 2.2

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

Pathway 2.1C

Community 2.1 to 2.5

The removal of only the mature Douglas-fir will leave only the less desirable true fir species in the overstory.

Pathway 2.1A

Community 2.1 to 2.6

With fire exclusion, or well over 100 years since last fire, the conifer stand will ultimately deteriorate (become over-mature) and become increasingly susceptible to infestation by insects or other pathogens.

Pathway 2.2A

Community 2.2 to 2.3

The combination of heavy season long livestock grazing and fire exclusion will accelerate woody plant (shrub) establishment and diminish the herbaceous understory.

Pathway 2.3A

Community 2.3 to 2.4

The combination of heavy season long livestock grazing and fire exclusion will accelerate woody plant establishment and diminish the herbaceous understory.

Pathway 2.4A

Community 2.4 to 2.5

The combination of heavy season long livestock grazing and fire exclusion will accelerate woody plant establishment and diminish the understory.

Pathway 2.5A

Community 2.5 to 2.1

The combination of heavy season long livestock grazing and fire exclusion will accelerate woody plant establishment and diminish the understory.

Pathway 2.5B

Community 2.5 to 2.2

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

Pathway 2.5C

Community 2.5 to 2.4

The removal of mature aspen will leave a stand of immature aspen, possibly with a few subalpine fir, white fir, and Douglas-fir in the understory.

Pathway 2.6A

Community 2.6 to 2.2

A stand-replacing wildfire will set the vegetation back to an early seral herb-dominated phase.

State 3

Tertiary Forest/Degraded State

State 3 is characterized by tertiary forests in which both the understory vegetation and tree condition have been degraded. Fire suppression accelerates the development of woody plant dominance.

Community 3.1

Mature Subalpine Fir/White Fir/Douglas-Fir/Sparse Understory

This plant community (3.1) is characterized by a mixed stand of mature subalpine fir, white fir, and Douglas-fir. A sparse understory of Geyer's sedge, and slender wheatgrass, heartleaf arnica, and other shade-tolerant plants may be present.

Community 3.2

Herb-Dominated

This plant community will develop within the first 5 years following the last fire or complete tree removal. Dominant grasses are Geyer's sedge and slender wheatgrass. A small component of introduced species may be present.

Community 3.3

Shrub-Herb Co-Dominance

A plant community co-dominated by shrubs and herbs will develop approximately 5 to 60 years after fire or complete tree removal. A small component of introduced species may be present.

Community 3.4

Immature Aspen

Immature aspen dominate the stand 60 to 80 years following the last fire or complete tree removal.

Community 3.5

Mature Aspen/Douglas-Fir

A stand of mature aspen intermixed with subalpine fir, white fir, and Douglas-fir will develop approximately 80 to 100 years following fire.

Community 3.6

Over-Mature, Blighted Mixed Conifers/Understory Sparse

This plant community is the result of fire exclusion well over 100 years. The conifers are over-mature and weakened, making them more susceptible to infestation by insects or other pathogens.

Pathway 3.1B

Community 3.1 to 3.2

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

Pathway 3.1C **Community 3.1 to 3.5**

The removal of only the mature Douglas-fir will leave only the less desirable true fir species in the overstory.

Pathway 3.1A **Community 3.1 to 3.6**

With fire exclusion, or well over 100 years since last fire, subalpine fir, white fir, and Douglas-fir will ultimately age, lose vigor, and become increasingly susceptible to infestation by insects or other pathogens.

Pathway 3.2A **Community 3.2 to 3.3**

After about 5 years, shrubs will begin to establish in the site.

Pathway 3.3A **Community 3.3 to 3.4**

Aspen will become established at the site after 60 to 80 years following the last wildfire or complete tree removal.

Pathway 3.4A **Community 3.4 to 3.5**

Aspen matures and immature conifers become well established in the understory 80 years after the last fire or complete tree removal.

Pathway 3.5A **Community 3.5 to 3.1**

After about 100 years following the last fire, subalpine fir, white fir, and Douglas-fir will become mature, shading out aspen and the shade-intolerant shrub and herb species in the understory.

Pathway 3.52 **Community 3.5 to 3.2**

A stand-replacing wildfire or intensive logging will set the vegetation back to an early seral herb-dominated phase. Logging opens up the forest canopy allowing grasses, herbs, and shrubs to dominate for 20 to 30 years. Community Pathway 3.5c: The removal of mature aspen will leave a stand of immature aspen, possibly with a few subalpine fir, white fir, and Douglas-fir in the understory.

Pathway 3.6A **Community 3.6 to 3.2**

A stand-replacing wildfire will set the vegetation back to an early seral herb-dominated phase.

Transition T1A **State 1 to 2**

The simultaneous introduction of exotic species, both plants and animals, and possible extinctions of native flora and fauna, along with climate change, has caused State 1 to transition to State 2. Europeans further altered this vegetation largely through logging, livestock grazing, trapping of beaver, and changing the fire regime. Continued

impacts could prevent the recovery toward potential conifer dominance (State 2, various phases). The reversal of these changes (i.e. a return pathway) back to State 1 is not impractical.

Transition T2A State 2 to 3

The Secondary Forest/ Introduced State will transition to the Tertiary Forest/ Degraded State following a second cycle of timber harvest or a stand replacing wildfire and further impacts from heavy continuous season-long grazing. Logging opens up the forest canopy allowing shade-intolerant species to flourish for 20 to 30 years. Secondary and tertiary disturbances can produce an array of vegetation from degraded temporary meadows to further simplified forests. The approach to this transition is indicated by a loss of species diversity, discontinuous litter and duff coverage, and evidence of accelerated soil erosion. This transition is triggered by excessive human utilization of the most economically desirable parts of the vegetation.

Citations