Ecological site group F022AW013CAESG
Cryic Mountains

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Key Characteristics

- mountains
- cryic temp regime

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 found on mountains generally above 5000 ft. on variable slopes.

Climate

The average annual precipitation is 40 to 80 inches (1,015 to 2,030 millimeters) in much of this area, and as much as 100 inches (2,540 millimeters) on the mountain peaks. The amount of precipitation increases with elevation and from south to north. Summers are dry, but there are occasional thunderstorms. Much of the winter precipitation occurs as snow. The average annual temperature is 25 to 63 degrees F (-4 to 17 degrees C), decreasing with elevation.

Soil features

The soils most dominant in this ESG are generally very deep, somewhat excessively drained soils that formed in colluvium and/or till derived from granitoid rock. The highest elevations will be more shallow, somewhat excessively drained soils formed in material weathered from andesitic rock.

Canisrocks, a sandy-skeletal, isotic Typic Cryorthents
Glacierpoint, a sandy-skeletal, isotic Xeric Dystrocryepts
Meiss, a loamy, isotic Lithic Humicryepts

Vegetation dynamics

This ESG is characterized by cryic soils on mountain landforms. It is a mixture of both the red fir and subalpine conifer habitat types and will depend on location and elevation and soils to distinguish between the red fir and mountain hemlock dominant zones. The red fir habitat type, which is typically found on frigid soils over a wide range of topography exclusive of very wet sites will be on the warmer and deeper cryic soils whereas the mountain hemlock and whitebark pine dominated stands will be at the highest elevations and likely harsher or shallower soils.

The red fir annual precipitation ranges from 1000 to 3000 mm (40 to 50 in) per year, primarily as snow that forms packs up to 5 m (15 ft) in winter. Summers are dry, limiting tree growth to seasonally available soil moisture. Small pockets of lodgepole pine also occur in wet sites scattered throughout large tracts of red fir. Similar inclusions of aspen may be found along riparian zones. Mountain meadows of various sizes, sometimes associated with small lakes, are also typical of red fir habitats. At higher elevations, red fir habitats include increasing numbers of mountain hemlock, western white pine, whitebark pine, and to a lesser extent, foxtail pine and limber pine. Noble fir is associated with red fir in the northwestern region of California.

The subalpine conifer forests typically occupy extremely harsh environments. Soils are generally thin and of low

quality coarse sand, gravel, volcanic debris, and rocks derived from decomposing parent material. Although subalpine fir and Engelmann spruce occur together on rocky, moist moraines and are considered to be indicators of high soil moisture, most stands of subalpine conifers are on dry, well-drained soils. Heavy snow cover is usual. Mean summer high temperatures probably do not exceed 18 C (65 F), and killing frosts are possible during all months. The growing season lasts only 7 to 9 weeks. Similarly, in bristlecone pine forests, measured precipitation over a 3-year period averaged 38 cm (15 in), much of it as snowfall. Intense winds are characteristic of these habitats and are generally distributed at high elevations in all significant mountain ranges of the State. It is well represented in the north, with an elevational range from about 2,100 to 2,900 m (7,000 to 9,500 ft); and in the Sierra Nevada, ranging from 2,700 to 3,350 m (9,000 to 11,000 ft.).

Stand structure in the red fir forests is typified by even-aged (established within 20-year span) groups of trees that cover several to thousands of square meters. The cause of this pattern is probably a history of recurrent lightning fires, windthrows, and insect outbreaks acting to kill groups of trees. Natural regeneration occurs on the disturbed site following the next good cone crop. Young seedling stands are thinned by competition for soil moisture during summer. Logging is becoming a more common source of disturbance, creating larger openings on average than historic disturbances.

Typical subalpine habitats are open forests with needle-leaved evergreen trees of low to medium stature. Stand density and tree height are typically greater at lower limits of its elevational range. In protected sites at lower elevations, tree height may exceed 30 m (100 ft), but trees on exposed sites and windy ridges near tree line are shaped into krummholz stunted, mat-like forms often only about 1 m (3 ft) tall. Shrubby vegetation and herbaceous ground cover are generally sparse or lacking. Litter accumulation is typically scanty, but fallen woody material persists for long periods in the cold climate. Several species dominate canopies of this type in different localities, either singly or in mixtures of two or more species (Parsons 1980). These include Engelmann spruce, subalpine fir, mountain hemlock, western white pine, lodgepole pine, whitebark pine, foxtail pine, bristlecone pine, and limber pine. Although typically of minor importance, a shrub understory may include Parry manzanita, squaw currant, purple mountain heather, oceanspray, and big sagebrush. Willows, western huckleberry, California huckleberry, Sierra bilberry, and alpine laurel occur on moist sites. Western wheatgrass, California brome, several species of lupines, and a variety of flowering annuals are common in the sparse ground cover.

Mature red fir stands normally are monotypic, with very few other plant species in any layer. Heavy shade and a thick layer of duff tends to inhibit understory vegetation, especially in dense stands. To the north, in the Klamath Mountains, red fir gives way to noble fir.

After disturbance typically logging or fire red fir vegetation on a site proceeds through 4 seral stages: grass/forb, shrub/sapling, pole/medium tree, and large tree. The grass/forb stage occurs when red fir seedlings become established on mineral soil or shallow litter and require about 5 years to reach a height of 15 cm (6 in). Herbs, are often sparse due to competition for soil moisture on light soils. In the shrub/sapling stage, large brush fields may develop after hot wildfires and are dominated by Ceanothus or other shrub species for many years. The pole/medium tree stage produces dense stands of young red fir that grow slowly with little mortality for many years. In the large tree stage, subdominant trees die and add to a growing layer of duff and downed woody material, and dominant trees continue to grow for several hundred years to heights of 40 m (130 ft). Old growth stands on poor sites in the Sagehen Creek drainage of Nevada County average about 400 years old. The understory of mature stands is limited to less than 5 percent cover of shade tolerant forbs (e.g., *Chimaphila menziesii*, *Pyrola picta*).

Seral patterns are defined here for both good and poor sites. The seral pattern on good sites includes 10 years in the grass/forb stage, 20 years in the shrub/seedling stage, 80 years in the pole/medium tree stage and 110 years in the large tree stage. The pattern on poor sites includes 20 years in the shrub/seedling stage, 100 years in the pole/medium tree stage and 250 years in the large tree stage. Hence the cumulative year totals are 200 from the good site and 400 from the poor site.

Most of the subalpine conifer, high-elevation forests in California have been little disturbed by human influence, but fire, wind, and other natural disturbances offer chances to study successional changes in these forests. Owing to their lack of economic importance, however, few such studies have been carried out in subalpine conifer habitat. Most of the canopy dominants are pioneers and probably also climax species, at least in harsher environments. For example, whitebark and limber pine, though less shade tolerant than subalpine fir, Engelmann spruce, and mountain hemlock, can regenerate without wildfire or logging due to their longevity and ability to survive extremely cold climates. Furthermore, the short growing seasons, as well as the typically open nature of the stands at higher

elevations help ensure regeneration. Little information is available, although the slow growth and longevity of most of the subalpine species lead to long time spans between stages. Many tree species that dominate stands of this type are well known for their longevity and slow growth. A whitebark pine 43 cm (17 in) in dbh was 800 years old (Arno 1967), foxtail pine has been aged at nearly 2000 years, and bristlecone pine has been aged at over 4600 years in the White Mountains of eastern California and over 4900 years on Wheeler Peak in eastern Nevada.

California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group
Red fir forest
Reginald H. Barrett
Subalpine conifer forest
Jared Verner and Kathryn L. Purcell

Major Land Resource Area

MLRA 022A
Sierra Nevada and Tehachapi Mountains

Subclasses

- F022AB100CA–Subalpine, sandy-skeletal, moderately steep slopes
- F022AB108CA–Very Deep Skeletal Concave North Slopes
- F022AB111CA–Skeletal Valley Floor Till
- F022AB113CA–Southern Gravelly Loamy Slopes
- F022AB114CA–Very Deep Southern Sandy Skeletal Slopes
- F022AC001CA–Cryic Sandy Mountain Slopes
- F022AC002CA–Cryic Sandy North Apsect Mountain Slopes
- F022AC003CA–Frigid-Cryic Sandy Slopes
- F022AC004CA–Cryic Very Gravelly Loamy Mountain Slopes
- F022AC005CA–Cryic Sheltered, Moist Sandy Mountain Slopes
- F022AC006CA–Moderately Deep Cryic Sandy Till
- F022AC007CA–North-Facing Cryic Loamy Mountain Slopes
- F022AC008CA–Cryic Volcanic Mountain Slopes
- F022AE001CA–Cryic Very Cobbly-Stony Mountain Slopes
- F022AW013CA–Cryic Mountains
- F022AX101CA–Moist Colluvial Headwater System
- F022AY103NV–POTR5/SYMPH/BRMA4
- F022AY105NV–PICO/ABMA/ARTRV/BRMA4
- F022AY106NV–PICO-ABMA/ACNE/ACOCO
- F022AY107NV–PICO/ARPA6/CAREX
- F022AY118NV–ABMA-PICO/ARTRV/BRMA4
- F022AY121NV–Pinus contorta-Abies magnifica/Artemisia tridentata ssp. tridentata/Achnatherum occidentale ssp. occidentale-Carex rossii
- F022AY126NV–Pinus albicaulis-Pinus flexilis/Poa-Carex
- F022AY127NV–PICO/CAREX/POA
- F022AY134NV–Pinus albicaulis/Carex-Poa
- R022AA010CA–Alpine Talus
- R022AA101CA–Sandy Very Deep Alpine Mountain Slopes
- R022AA102CA–Alpine Bedrock Benches
- R022AA104CA–Loamy Skeletal Moist Swales
- R022AA106CA–Gravelly Alpine Till
- R022AA200CA–Alpine Scree
- R022AB001CA–Shallow Dry Bedrock Pockets
- R022AB004CA–Shallow Sandy Bedrock Slopes
- R022AB006CA–Bedrock Fissures
- R022AB009CA–Subalpine Moderately Deep Loamy-Skeletal Slopes
- R022AB010CA–Subalpine Sandy Talus

- R022AB012CA–Southern Glacial Outwash Plains
- R022AC202CA–Shallow Andesite Ridge
- R022AC204CA–Cryic, Umbric Or Andic Slopes
- R022AX008CA–Moist Bedrock Pockets
- R022AX009CA–Subalpine Discharge Slopes
- R022AY010NV–MOUNTAIN SHOULDERS 30+ P.Z.
- R022AY012NV–BARREN SLOPE 20+ P.Z.
- R022AY021NV–SOUTH SLOPE 30+ P.Z.
- R022AY024NV–MAHOGANY SAVANNA
- R022AY025NV–MAHOGANY THICKET
- R022AY027NV–MOUNTAIN BASIN
- R022AY031NV–LOAMY SLOPE 30+ P.Z.
- R022AY032NV–ALPINE RIDGE
- R022AY038NV–SHALLOW LOAM 30+ P.Z.
- R022AZ039CA–STONY SOUTH SLOPE 16-30 P.Z.
- R022AZ045CA– GRAVELLY LOAMY SLOPE 20-30 P.Z.
- R022AZ046CA–ASPEN THICKET
- R022AZ051CA–KRUMMHOLZ
- R022AZ052CA–GRAVELLY SLOPE 16+ P.Z.
- R022AZ054CA–MOIST MOUNTAIN BASIN

Correlated Map Unit Components

22667583, 22667671, 22667676, 22667941, 22667943, 22667947, 22667952, 22667960, 22667037, 22667030, 22667039, 22667556, 22667563, 22667181, 22667184, 22667186, 22667265, 22667266, 23015952, 23016194, 23016415, 23016395, 23016397, 23016401, 23016390, 23015832, 23016384, 23016096, 23016099, 23016094, 23016103, 23016114, 23015783, 23016003, 23015994, 23016138, 23015800, 23016320, 23016312, 23016313, 23015767, 23015764, 23016134, 23016133, 23015941, 23015942, 23016590, 23016263, 23016604, 23016181, 23016166, 23016174, 23016544, 23015775, 23015777, 23015753, 23015748, 23016516, 23016520, 23016518, 23016304, 23016302, 23016536, 23016537, 23016339, 23016342, 23016533, 23016532, 23016408, 23016300, 23016295, 23020509, 23020508, 23027678, 23027680, 23028163, 23028245, 23028595, 23028248, 23028773, 23028774, 23028777, 23028778, 23028781, 23028597, 23029070, 23028685, 23028688, 23028689, 23028131, 22590084, 22590085, 22589981, 22589973, 22590124, 22590120, 22590123, 22589935, 22589929, 22589931, 22590076, 22590078, 22590135, 22590100, 22590115, 22590108, 22589770, 22590006, 22590009, 22589764, 22589765, 23488132, 23488139, 23488192, 23488184, 23488406, 23488395, 23488747, 23488741, 23488748, 23488173, 23488171, 23488005, 23488001, 23488848, 23488841, 23488853, 23488858, 23488011, 23488013, 23488007, 23488210, 23488208, 23488434, 23488432, 23488037, 23488038, 23488082, 23488088, 23488449, 23488453, 23488466, 23488461, 23488464, 23488049, 23488469, 23488472, 23488478, 23488475, 23488477, 23488150, 23488141, 23488146, 23488219, 23488227, 23488222, 23488235, 23488500, 23488505, 23488982, 23488983, 23488978, 23488989, 23488992, 23488994, 23488064, 23488066, 23488094, 23488089, 23488091, 23488152, 23488156, 23488165, 23488167, 23488256, 23488257, 23488288, 23488289, 23488370, 23488544, 23488549, 23489006, 23489009, 23488555, 23488556, 23488786, 23488789, 23488591, 23488585, 23488873, 23488875, 23488878, 23488883, 23488613, 23488614, 23488624, 23488625, 23488627, 23488421, 23488427, 23488429, 23488634, 23488636, 23488677, 23488681, 23489026, 23489028, 23488892, 23488896, 23488901, 23488906, 23488916, 23488909, 23488922, 23488926, 23488931, 23488951, 23489044, 23489050, 23488957, 23488965, 23489060, 23489062, 23489076, 23488808, 23488801, 23489082, 23489100, 23488758, 23488764, 23488766, 23488770, 22591536, 22591537, 22592082, 22592076, 22592100, 22592089, 22591687, 22591684, 22591945, 22591941, 22591947, 22591801, 22591803, 22591925, 22591924, 22591407, 22592130, 22591526, 22591528, 22591631, 22591628, 22591618, 22591615, 22591557, 22592072, 22592068, 22592067, 22591850, 22591849, 22591544, 22591548, 22591582, 22591578, 22591314, 22591312, 23483971, 23483962, 23482818, 23482813, 23482819, 23482825, 23482829, 23483027, 23483026, 23483072, 23483073, 23483794, 23483147, 23483172, 23483169, 23482835, 23482834, 23482843, 23482846, 23482844, 23483178, 23482852, 23482858, 23482857, 23483684, 23483976, 23483980, 23483984, 23483983, 23484003, 23484007, 23484009, 23484025, 23484026, 23483376, 23483386, 23483445, 23483502, 23483510, 23483511, 23483516, 23483527, 23483553, 23483555, 23483564, 23483631, 23483629, 23483997, 23483994, 22595418, 22595615, 22595606, 22595911, 22595426, 22595666, 22595665, 22595671, 22595677, 22595680, 22595428, 22595430, 22595914, 22595912, 22595432, 22595434, 22595917, 22595920, 22595184, 22595185, 22595187, 22595189, 22595192, 22595198, 22595921, 22595923, 22595436, 22595442, 22595926, 22595927, 22595443, 22595449, 22595466, 22595464,

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Stage

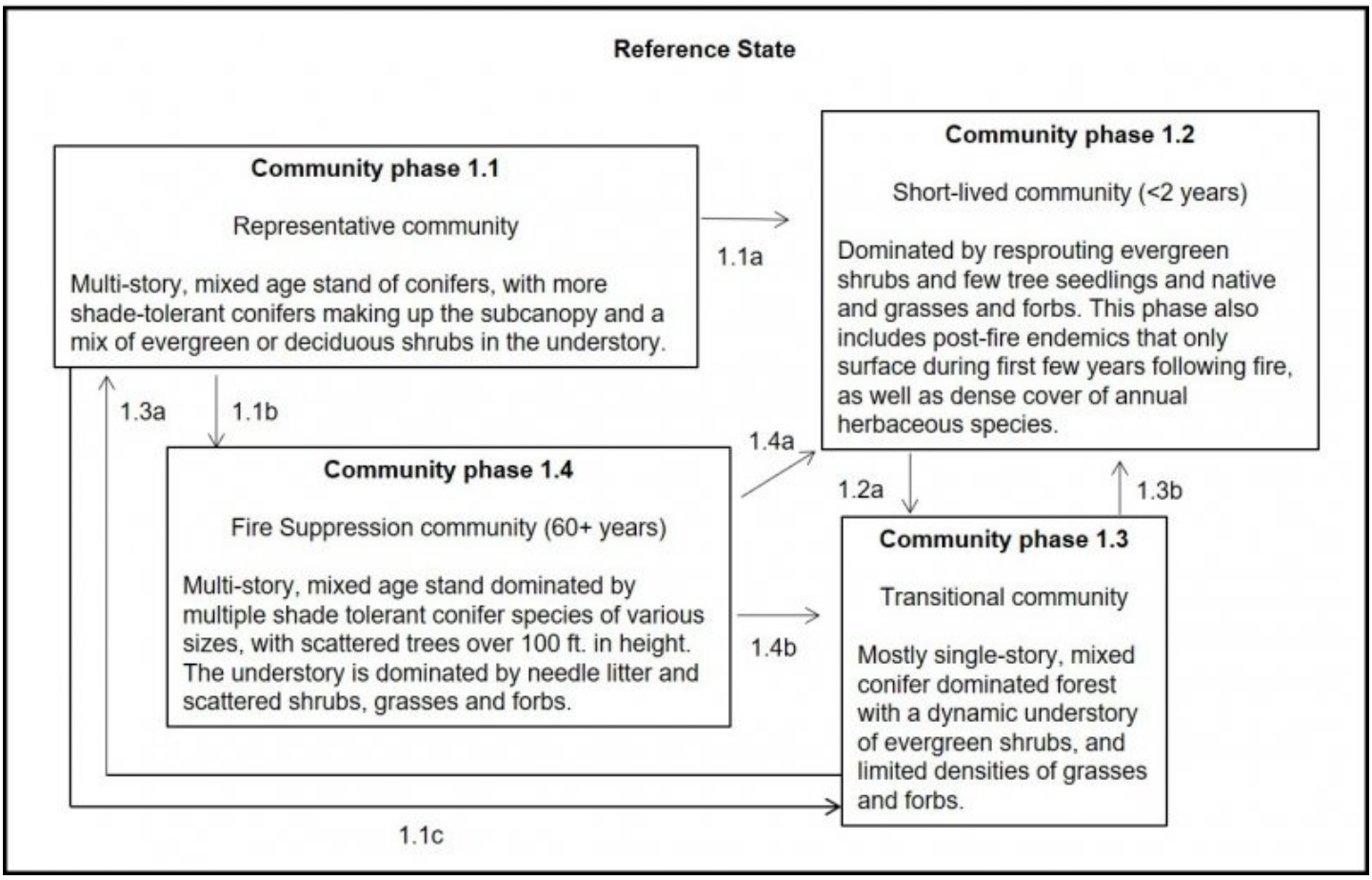
Provisional

Contributors

Kendra Moseley
Curtis Talbot
Darren Pinnegar

State and transition model

Cryic Mountains



Reference State Community Pathways (Natural dynamics only – no management scenarios) **This model was developed based more for the red fir areas than the harsh upper elevations areas at this time.

After disturbance typically logging or fire red fir vegetation on a site proceeds through 4 seral stages: grass/forb, shrub/sapling, pole/medium tree, and large tree. The grass/forb stage occurs when red fir seedlings become established on mineral soil or shallow litter and require about 5 years to reach a height of 15 cm (6 in). Herbs, are often sparse due to competition for soil moisture on light soils. In the shrub/sapling stage, large brush fields may develop after hot wildfires and are dominated by Ceanothus or other shrub species for many years. The pole/medium tree stage produces dense stands of young red fir that grow slowly with little mortality for many years. In the large tree stage, subdominant trees die and add to a growing layer of duff and downed woody material, and dominant trees continue to grow for several hundred years to heights of 40 m (130 ft). Old growth stands on poor sites in the Sagehen Creek drainage of Nevada County average about 400 years old. The understory of mature stands is limited to less than 5 percent cover of shade tolerant forbs (e.g., Chimaphila menziesii, Pyrola picta). Seral patterns are defined here for both good and poor sites. The seral pattern on good sites includes 10 years in the grass/forb stage, 20 years in the shrub/seedling stage, 80 years in the pole/medium tree stage and 110 years in the large tree stage. The pattern on poor sites includes 20 years in the shrub/seedling stage, 100 years in the pole/medium tree stage and 250 years in the large tree stage. Hence the cumulative year totals are 200 from the good site and 400 from the poor site.

1.1a This community pathway occurs following a high severity fire. A prescription of mechanical clearing and burning of slash may also produce the same results.

1.1b This community pathway occurs over time without fire (60+ years), as the more shade-tolerant conifers over top and shade out some of the more shade-intolerant species.

1.1c This community pathway occurs following a low to moderate severity fire that removes younger subcanopy conifers, some less fire tolerant trees and understory species.

1.2a This community pathway occurs over time without vegetation management or major disturbances.

1.3a This community pathway occurs over time without vegetation management or major disturbances and normal progression.

1.3b This community pathway occurs following a low to moderate severity fire.

1.4a This community pathway occurs following a high severity fire that removes everything.

1.4b This community pathway occurs following a moderate severity fire.

Montane chaparral species are common post-disturbance on these deeper forest soils. After disturbance (logging, fire, erosion) chaparral proliferates and may exclude conifers and other vegetation for many years. However, chaparral may facilitate the germination of red fir seedlings and other shade tolerant conifers by providing a protective cover, moderating microclimate, and improving soil conditions. Chaparral shrubs may be an essential link in forest succession by building up soil nutrient levels, especially nitrogen, to the point where trees can survive. In mature timber stands, chaparral species may senesce due to insufficient light through the canopy and are only present as a sparse understory. Thus, silvicultural practices have a strong influence on the structure of montane chaparral.

Citations