11360

Mediterranean California Alpine Dry Tundra

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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| None | None | None | None |
| None | None | None | None |

Vegetation Type

Herbaceous

Map Zone

6

Geographic Range

These dry meadows typically occur in the northern Sierra Nevada, Klamath Mountains, and Cascade Mountains.

Biophysical Site Description

The alpine belt is above timberline (approximately >3,200 m) and below the permanent snow level (<4,500 m). These meadows are typically found on gentle-to-steep slopes, flat ridges, and upper basins where the soil is thin and the water supply is constant and strongly regulated by snowpatch patterns. These sites are generally very well drained and xeric after the snow melts.

Vegetation Description

The system is commonly comprised of a mosaic of small-patch plant communities that are dominated by sedges, grasses, and forbs. Characteristic species include *Phlox diffusa*, *Phlox covillei*, *Erigeron pygmaeus*, *Podistera nevadensis*, *Carex congdonii*, *Calamagrostis purpurascens*, *Eriogonum incanum*, *Raillardiopsis muirii* (=*Raillardella muirii*), *Castilleja nana*, *Erigeron compositus*, *Eriogonum ovalifolium*, *Eriogonum gracilipes*, etc. There is a rocky mesic version of this system with *Hulsea algida*, *Saxifraga tolmiei*, *Carex helleri*, *Ranunculus eschscholtzii*, *Polemonium eximium*, *Salix reticulata* (rarely), *Oxyria digyna*, *Sibbaldia procumbens*, etc., that can be found near snowmelt patches generally on sheltered, steep, rocky slopes.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PHDI3 | *Phlox diffusa* | Spreading phlox |
| PHCO12 | *Phlox covillei* | Coville’s phlox |
| ERPY | *Erigeron pygmaeus* | Pygmy fleabane |
| PONE4 | *Podistera nevadensis* | Nevada podistera |
| CACO12 | *Carex congdonii* | Congdon’s sedge |
| CAPU | *Calamagrostis purpurascens* | Purple reedgrass |
| ERIN9 | *Eriogonum incanum* | Frosted buckwheat |
| RAMU3 | *Raillardiopsis muirii* | Muir’s raillardiopsis |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Vegetation in these areas is controlled by snow retention, wind desiccation, permafrost, and a short growing season. Dry summers associated with major drought years favor grasses over forbs, whereas wet summers cause a more diverse mixture of forbs and graminoids.

Avalanches on steeper slopes where soil accumulated can cause infrequent soil slips, which expose bare ground.

Very small burns of a few square meters (replacement fire) caused by lightning strikes were included as a rare disturbance, although lightning storms are frequent at those elevations. The calculation of lightning strike frequency was not based on fire return intervals, but on the number of strikes (in this case, five) per 1,000 possible locations per year.

Native herbivores (Rocky Mountain bighorn sheep, mule deer, and elk) were common in the Alpine but probably did not greatly affect vegetation cover because animals move frequently as they reduce vegetation cover.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 210 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 210 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

This ecological system can occupy large areas of the alpine. Patch size varies from a few acres to 1,000ac on mountain ridges and tops. Stand-replacement fires may be caused by lightning strikes that do not spread due to the sparse cover of fine fuels and extensive barren areas acting as fire breaks.

Adjacency or Identification Concerns

Alpine dry tundra typically inter-mingles with alpine bedrock and scree, ice field, fell-field,

alpine dwarf-shrubland, and alpine/subalpine wet meadows.

Several experts claim that the alpine is one of the community types more threatened by global climate change in the decades to come. Essentially, the tree line is moving up.

Issues or Problems

No data on fire or effects of lightning strikes. No data on recovery time after stand-replacing events.

Native Uncharacteristic Conditions

Comments - none

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | B | B | B | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | B | B | B | B | B | B | B | B |
| Herb | >1.0 | A | A | B | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 0-5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | >50 | B | B | B | B | B | UN | UN | UN | UN | UN |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 3 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CAREX | Carex | Sedge | Upper |
| DECA18 | Deschampsia caespitosa | Tufted hairgrass | Upper |
| FEBR | Festuca brachyphylla | Alpine fescue | Upper |

Description

Very exposed (barren) state following a lightning strike. Soil (not rock) may dominate the area. Grasses are more common than forbs.

Structural classes originally input as 0-10% herbaceous. However, due to mapping rules, changed to 0-20%.

*Maximum Tree Size Class*  
None

Class B 97 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CAREX | Carex | Sedge | Upper |
| DECA18 | Deschampsia caespitosa | Tufted hairgrass | Upper |
| ARAR9 | Artemisia arctica | Boreal sagebrush | Upper |

Description

Alpine community is dominated by graminoids, herbaceous perennials, and few low-growing shrubs. Plant cover may vary from 2% on exposed sites to as much as 25% on mesic and more protected sites. Infrequent replacement fire in the form of lightning strikes, severe summer droughts, and rare avalanches on steeper slopes with soil (1/1,000).

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:CLS | 2 |
| Late1:CLS | 3 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Optional 1 | Late1:CLS | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.01 | 100 | Yes | 0 |

Optional Disturbances

Optional 1: Avalanches

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