13860

Acadian-Appalachian Alpine 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

Shrubland

Map Zones

66

Geographic Range

Higher summits of the northern Appalachian Mountains, from northern New England and the Adirondacks into the Canadian Gaspe, extending south in scattered locations into southern New England.

Biophysical Site Description

Occurs above treeline on northeastern mountains. This system typically occurs above 4,900ft and is bounded on the lower elevation by Acadian-Appalachian Subalpine Woodland and Heath-Krummholz (BpS 1389).

The vegetation is exposed to high winds, a short growing season, low temperatures, heavy cloud cover and snow accumulation, high precipitation and fog interception, and well drained soils with low nutrient availability and high organic matter content (Sperduto and Cogbill 1999).

Most of the cover is dwarf-shrubland, lichen, or sparse vegetation; islands of taller shrubs may occur in protected spots. This system includes wetland depressions, small alpine bogs, within the surrounding upland matrix.

Vegetation Description

Overall plant composition in this system relates well to elevation range, area, and range of soil moisture conditions (Sperduto and Cogbill 1999, Bliss 1963). Most of the cover is dwarf-shrubland, lichen, or sparse vegetation; islands of taller shrubs may occur in protected spots. The dominant plants are ericads (*Vaccinium uliginosum* is diagnostic and often dominant, with several other alpine-restricted ericads such as *Phyllodoce caerulea* and *Loiseleuria procumbens*) and cushion-plants such as *Diapensia lapponica. Carex bigelowii* is a characteristic and, in some places, locally dominant sedge.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| VAUL | *Vaccinium uliginosum* | Bog blueberry |

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

Disturbance Description

Weather factors (wind/precipitation) are the primary agents of stress and disturbance to these systems. These factors are year-round, persistent, and chronic. In particular, permafrost and frost phenomena characterize parts of the Presidential Range, the largest and most diverse of the region’s alpine areas (Sperduto and Cogbill 1999).

These systems typically do not contain enough fuel to sustain fire. Rare landslides and snowslides may be the only probabilistic disturbances to affect this system.

Fire Frequency

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

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

None

Adjacency or Identification Concerns

Issues or Problems

Alpine and sub-alpine communities are among the most sensitive systems to climate change. In fact, regional projections of future greenhouse-gas-induced climatic warming indicate that alpine tundra systems may be lost between 440N and 570N (Delacourt and Delacourt 1998).

Native Uncharacteristic Conditions

Because of the high scenic value of these systems, human activities (i.e., hiking trails) are a localized source of persistent stress and disturbance. Most systems retain significant areas of natural vegetation with localized trampling of vegetation, soil erosion, and unofficial trail development. Some areas have been heavily trampled or reduced to gravel or bedrock with little hope of recovery at current recreational levels (Sperduo and Cogbill 1999).

Comments

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 | A | A | A | A | A | A | UN | UN |
| Herb | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Herb | >1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | B | B | B | B | B | B | B | B | UN | UN |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | B | B | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | UN | UN | UN | 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 14 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| DILA | Diapensia lapponica | Pincushion plant | lower |
| CABI5 | Carex bigelowii | Bigelow’s sedge | lower |

Description

This class represents the first 300yrs after a catastrophic disturbance that scraped the area down to bare rock.

*Maximum Tree Size Class*  
None

Class B 86 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| VAUL | Vaccinium uliginosum | Bog blueberry |  |
| PHCA10 | Phyllodoce caerulea | Blue mountainheath |  |

Description

This class represents the mature vegetation of this system, a mix of dwarf-shrubland, herbaceous vegetation, and patches of lichen/bare rock.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Late1:OPN | 299 |
| Late1:OPN | 300 | Late1:OPN | 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 | Early1:OPN | Early1:OPN | 0.0005 | 2000 | Yes | 0 |
| Optional 1 | Late1:OPN | Early1:OPN | 0.0005 | 2000 | Yes | 0 |

Optional Disturbances

Optional 1: Landslide/snowslide

References

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