16870

North American Arctic Lichen Tundra

BpS Model/Description Version: Nov. 2024

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Kori Blankenship | kblankenship@tnc.org | Janet Jorgenson | Janet\_Jorgenson@fws.gov |
| Keith Boggs | Ankwb@uaa.alaska.edu | None | None |
| None | None | None | None |

Reviewer: Robin Innes

Vegetation Type

Herbaceous

Map Zones

67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77

Geographic Range

This Biophysical Setting (BpS) occurs throughout arctic AK and in MZ76, from the Bristol Bay lowlands in southwestern AK to the North Slope on the Arctic Ocean. In MZ76 this type is found in Nowacki ecoregions 8, 9 and 10.

Biophysical Site Description

This BpS is common in the hills and mountains of arctic AK on sites that are typically too harsh to support the growth of vascular plants. Common slope positions include sideslopes and exposed summits and ridges. Sites are typically acidic and dry to mesic and often rocky. It is especially common on recent volcanic deposits with little soil development (Boggs et al. 2008).

Vegetation Description

The following information was taken from the draft Arctic Ecological Systems description (Boggs et al. 2008):

Lichen cover is >25%, and vascular plant species cover is <25%. Foliose and fruticose lichens dominate and include *Umbilicaria* spp., *Rhizocarpon geographicum, Cladina stellaris, Racomitrium lanuginosum, Flavocetraria* spp. and *Alectoria ochroleuca*. Common dwarf-shrubs include *Loiseleuria procumbens, Betula nana, Ledum palustre* ssp. *decumbens, Empetrum nigrum,* and *Vaccinium uliginosum*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| UMBIL2 | *Umbilicaria spp.* | Navel lichen |
| RHGE60 | *Rhizocarpon geographicum* | World map lichen |
| CLST60 | *Cladina stellaris* | Star reindeer lichen |
| RALA70 | *Racomitrium lanuginosum* | Racomitrium moss |
| FLAVO3 | *Flavocetraria spp.* | Flavocetraria |
| ALOC60 | *Alectoria ochroleuca* | Witch's hair lichen |
| LOPR | *Loiseleuria procumbens* | Alpine azalea |

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

Disturbance Description

Crustose lichen communities are likely early seral but are likely to persist indefinitely because of harsh environmental conditions that inhibit the growth of vascular plants (Viereck et al. 1992; III.C.2.a). The successional status of foliose and fruticose lichen communities is unknown (Viereck et al. 1992; III.C.2.b).

In 2013 an extensive search was done by Fire Effects Information Systems staff to locate information for a synthesis on fire regimes of Alaskan tundra communities (Innes 2013). The review notes that lichens can establish within a few years post-fire, but recovery can take more than 100 years on severely burned sites (Innes 2013).

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

Small to large patch

Adjacency or Identification Concerns

Issues or Problems

Native Uncharacteristic Conditions

Comments

During LANDFIRE National this system was created for the AK Arctic region and did not receive review for other regions in the state. This model was created by Kori Blankenship and Keith Boggs based input from experts who attended the LANDFIRE Arctic Modeling Meeting (April 2008) and the draft Arctic Ecological Systems description (Boggs et al. 2008).

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 | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | A | A | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | A | A | 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 100 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| UMBIL2 | *Umbilicaria* spp. | Navel lichen | Upper |
| RHGE60 | *Rhizocarpon geographicum* | World map lichen | Upper |
| CLST60 | *Cladina stellaris* | Star reindeer lichen | Upper |
| RALA70 | *Racomitrium lanuginosum* | Racomitrium moss | Upper |

Description

This class represents the Lichen Tundra system. Refer to the vegetation description for common species.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Mid1:ALL | 0 | Mid1:ALL | 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** |

References

Boggs et al. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Draft Ecological Systems Description for the Alaska Arctic Region.

Innes, Robin J. 2013. Fire regimes of Alaskan tundra communities. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us

/database/feis/fire\_regimes/AK\_tundra/all.html [2016, June 28].

Viereck, L.A., Dyrness, C.T., Batten, A.R., Wenzlick, K.J. 1992. The Alaska vegetation classification. Pacific Northwest Research Station, USDA Forest Service, Portland, OR. Gen. Tech. Rep. PNW-GTR286. 278 p.