16110

Western North American Boreal Mesic Bluejoint-Forb Meadow

BpS Model/Description Version: Nov. 2024

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Tina Boucher | antvb@uaa.alaska.edu | None | None |
| Colleen Ryan | colleen\_ryan@tnc.org | None | None |
| None | None | None | None |

Reviewer: Robin Innes

Vegetation Type

Herbaceous

Map Zones

68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 80

Geographic Range

This Biophysical Setting (BpS) occurs throughout the boreal and boreal transition regions of AK, though it appears to be less common north of the AK Range (NatureServe 2008).

Biophysical Site Description

Soils are typically fine-textured mineral and may be poorly drained (on flats) to well drained (on sideslopes). In the Sub-boreal region, mesic *Calamagrostis canadensis* meadows often occur near treeline interspersed with subalpine tall shrub (NatureServe 2008). Its elevational limit is just above the limit of tall shrub (within 100m). This system may also occur as a small patch in drained lake beds within the boreal region.

Vegetation Description

*Calamagrostis canadensis* is the species that characterizes this system, though other grasses, forbs, and ferns may codominate. Fern- and forb-dominated patches commonly occur in a matrix of bluejoint meadow. Mosses are uncommon, but patchy feathermosses may be present in more open stands. Lichens and woody plants are absent or scarce, though this system is often found in a mosaic with tall shrub (especially alder) communities (Viereck et al. 1992).

The vegetation is usually dense, with canopy height of 0.8 to 1.4 meters, occasionally reaching 2 meters (Viereck et al. 1992). Species composition ranges from nearly pure stands of *Calamagrostis* *canadensis* to mixtures of *C.* *canadensis* with forbs, ferns, and other grasses, including *Heracleum maximum, Angelica lucida, Chamerion angustifolium, Athyrium filix-femina, Dryopteris expansa, Equisetum arvense* and *Veratrum viride* (Viereck et al 1992).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CACA4 | *Calamagrostis canadensis* | Bluejoint |
| CHANA2 | *Chamerion angustifolium ssp. angustifolium* | Fireweed |
| HEMA80 | *Heracleum maximum* | Common cowparsnip |
| ATFI | *Athyrium filix-femina* | Common ladyfern |

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

Disturbance Description

Though Mesic Bluejoint Meadows often occur on disturbed sites, the Sub-boreal Mesic Bluejoint Meadow system, as described here, is stable over long periods. The fire regime is likely to be similar to that of the alder tall shrub vegetation (Alaska Sub-Boreal Mesic Subalpine Alder Shrubland (BpS 16090)) typically found just downslope from this system. However, the Sub-boreal Mesic Bluejoint Meadow system is extremely flammable in early summer prior to green-up. Fires in this time period generally do not burn the duff layer since the ground is usually still wet or frozen.

Avalanches are possible but are unlikely to affect the vegetation.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 1034 | 83 |  |  |
| Moderate (Mixed) | 5112 | 17 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 860 | 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

Large patch

Adjacency or Identification Concerns

Mesic Bluejoint-Forb Meadow vegetation may also appear as a seral stage in a variety of other systems following fire or other disturbance. This system includes meadows that are long-term landscape features. This system is typically found just downslope from the Alaska Sub-boreal and Maritime Alpine Mesic Herbaceous Meadow or Alpine Dwarf-Shrubland system and upslope or interspersed with Alaska Sub-Boreal Mesic Subalpine Alder Shrubland. In some cases, this system may be found directly adjacent to treeline.

Issues or Problems

In the absence of data, the fire regime for this system was assumed to be similar to that of the Alaska Sub-Boreal Mesic Subalpine Alder Shrubland system (BpS 16090) often found adjacent to this system.

A 2015 literature review on wet and mesic herbaceous systems in AK (Innes 2015) notes that there are few fire history studies in these vegetation types and suggests the possibility that surface and ground fires may be more common than what is documented in the literature.

Native Uncharacteristic Conditions

A climate change study in northwestern AK (DeGrange et al. 2013) predicted that upland bluejoint reedgrass-herb meadows would increase because of predicted increases in fire frequency and that upland sedge-mountain-avens meadows would decrease as a result of predicted increase in thermokarst development, shrub expansion, and soil acidification.

Comments

In 2015 an extensive search was done by FEIS staff to locate information for a synthesis on [fire regimes of Alaskan wet and mesic herbaceous systems](http://www.fs.fed.us/database/feis/fire_regimes/AK_wet_herbaceous/all.html) (Innes 2015). The synthesis notes that “LANDFIRE models estimated the portions of replacement, surface, and mixed-severity fires likely in wet and mesic herbaceous BpSs but did not include ground fire, which is an integral fire type in many wet and mesic herbaceous systems.”

The fire regime for this system was based on the Alaska Sub-Boreal Mesic Subalpine Alder Shrubland model by Kori Blankenship.

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 | UN | UN | UN | UN | UN | UN | UN | UN |
| 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 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CACA4 | *Calamagrostis canadensis* | Bluejoint | Upper |
| CHANA2 | *Chamerion angustifolium* ssp*. angustifolium* | Fireweed | Upper |
| HEMA80 | *Heracleum maximum* | Common cowparsnip | Upper |
| ATFI | *Athyrium filix-femina* | Common ladyfern | Upper |

Description

This class represents the stable Mesic Bluejoint-Forb Meadow system. *Calamagrostis canadensis* and other grasses, forbs and/or ferns dominate the site.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Early1: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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.0002 | 5000 | No | 0 |

References

DeGange, Anthony R.; Marcot, Bruce G.; Lawler, James; Jorgenson, Torre; Winfree, Robert. 2013. Predicting the effects of climate change on ecosystems and wildlife habitat in northwest Alaska: results from the WildCast project. Alaska Park Science. 12(2): 67-73. [89037]

DeVelice, R.L., Hubbard, C.J., Boggs, K. et al. 1999. Plant community types of the Chugach National Forest. Tech. Publ. R10-TP-76. Juneau, AK: USDA Forest Service, Alaska Region. 375p.

Innes, Robin J. 2015. Fire regimes of Alaskan wet and mesic herbaceous systems. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/fire\_regimes/AK\_wet\_herbaceous/all.html [2016, August 2].

Jorgenson, M.T. et al. 2003. An ecological land survey for Fort Richardson, Alaska. Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, ERDC/CRREL TR-03019.

NatureServe. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Draft Ecological Systems Description for Alaska Boreal and Sub-boreal Regions.

Viereck et al. 1992. The Alaska vegetation classification. Pacific Northwest Research Station, USDA Forest Service, Portland, OR. Gen. Tech. Rep. PNW-GTR286. 278 p.