16330

Western North American Boreal Alpine Mesic Herbaceous Meadow

BpS Model/Description Version: Nov. 2024

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| --- | --- | --- | --- |
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Vegetation Type

Herbaceous

Map Zones

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

Geographic Range

This Biophysical Setting (BpS) occurs on gentle slopes in subalpine and lower alpine environments throughout boreal AK (NatureServe 2008).

Biophysical Site Description

This BpS occurs on alpine and subalpine slopes. It tends to occur in small patches in a matrix with dwarf or low shrub systems. Soils are moist to mesic.

Vegetation Description

*Carex bigelowii* is the dominant species. Other common species may include *Luzula confusa* and lichens. Dwarf shrubs such as *Arctostaphylos alpina, Empetrum nigrum, Salix pulchra, Betula nana,* and *Vaccinium uliginosum* are usually present, but contribute less than 25% to the canopy cover (NatureServe 2008, Boggs and Sturdy 2005). Wetter sites may include more sedges and *Salix* spp. This system may form a mosaic with dwarf and low shrub systems.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CABI5 | *Carex bigelowii* | Bigelow's sedge |
| SAPUL | *Salix pulchra* | Tealeaf willow |
| BENA | *Betula nana* | Dwarf birch |
| ARAL2 | *Arctostaphylos alpina* | Alpine bearberry |
| EMNI | *Empetrum nigrum* | Black crowberry |

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

Disturbance Description

Little is known about the disturbance regime of this system. It tends to occur adjacent to low shrub and alpine tundra systems, and even in a patchy mosaic with dwarf and low shrub systems. Because these adjacent systems burn, it is likely that some fire will carry through this system, especially in drier periods. Fire frequency is likely to depend on the adjacent vegetation. For this model, the fire return interval (FRI) was estimated at twice that of the adjacent Western North American Boreal Mesic Scrub Birch-Willow Shrubland - Boreal BpS (16101).

Little is known about post-fire dynamics, but *Carex bigelowii* is expected to maintain its dominance. Dwarf shrubs are likely to resprout or establish gradually over time but will remain a minor component of the system.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 398 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 398 | 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

Small to large patch

Adjacency or Identification Concerns

There is no species overlap between boreal and Sub-boreal herbaceous alpine meadow types. Slope position may also be different. This BpS often occurs in a patchy mosaic with low and dwarf shrub types (*Betula nana* and ericaceous dwarf shrub types).

Issues or Problems

Native Uncharacteristic Conditions

Comments

In 2015, an extensive search was done by Fire Effects Information System staff to locate information for a synthesis on fire regimes of Alaskan wet and mesic herbaceous systems (Innes 2015). No published information was found on mesic herbaceous meadows in the boreal alpine and subalpine zones.

During LANDFIRE National this model was created for the boreal region of AK and did not receive review for other parts of the state. Because no data are available about the dynamics of this fairly minor system, this model was based on best estimates, considering vegetation and site characteristics and the dynamics of adjacent vegetation types.

Page Spencer is a suggested reviewer for this system.

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 | 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** |
| CABI5 | *Carex bigelowii* | Bigelow's sedge | Upper |
| SAPUL | *Salix pulchra* | Tealeaf willow | Upper |
| BENA | *Betula nana* | Dwarf birch | Upper |
| ARAL2 | *Arctostaphylos alpina* | Alpine bearberry | Upper |
| EMNI | *Empetrum nigrum* | Black crowberry | Upper |

Description

Mesic herbaceous. In interior Alaska, *Carex bigelowii* is the dominant species. Other herbaceous species, including *Luzula confusa*, are frequently present, along with a well-developed lichen layer. Dwarf shrubs such as *Arctostaphylos alpina, Empetrum nigrum,* *Salix pulchra,* and *Betula nana* are present, and in places can contribute 25% -50% to the canopy cover (Boggs and Sturdy 2005, Spellman pers. comm. 2022).

Although this system tends to be fairly moist, litter accumulation will provide enough fuel to carry a fire during dry periods. This BpS is relatively stable over time.

*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 | 0.0025 | 400 | No | 0 |

References

Boggs, K. and Sturdy, M. 2005. Plant associations and post-fire vegetation succession in Yukon-Charley Rivers National Preserve. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage. Prepared For: National Park Service, Landcover Mapping Program, National Park Service-Alaska Support Office, Anchorage, Alaska 99501.

Boggs, K., A. Garibaldi, J. Stevens, J. Grunblatt, and T. Helt. 2001. Denali National Park and Preserve Landcover mapping project. Volume 2: Landcover classes and plant associations. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, 707 A Street, Anchorage, AK. 164 pp.

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].

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