16102

Western North American Boreal Mesic Scrub Birch-Willow Shrubland - Alaska Sub-boreal

Model Date: 04/24/08 Report Date: 9/11/15

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Kori Blankenship | kblankenship@tnc.org | None | None |
| Tina Boucher | antvb@uaa.alaska.edu | None | None |
| None | None | None | None |

Reviewer: Robin Innes

Vegetation Type

Upland Shrubland

Map Zones

73, 74, 75,77

Model Splits or Lumps

This BpS is split into multiple models:

Western North American Boreal Mesic Scrub Birch-Willow Shrubland was split into Boreal and Sub-boreal variants for BpS modeling so that a longer fire return interval could be applied to the Sub-boreal variant.

Geographic Range

This system is found in the Sub-boreal region from low elevations to the subalpine zone. This system is more common in the northern portion of the Sub-boreal region (e.g., northern Cook Inlet); the tall shrub system dominated by Alnus viridis spp. Sinuata replaces it in the southern portion of the region.

Biophysical Site Description

This system occurs on well-drained sites often in the subalpine. It is found on mesic sites on mid to upper slopes, above tree line and on terraces and sideslopes. Soils are mineral with a well-decomposed organic layer of 5-30 cm thick (Viereck et al. 1992, NatureServe 2008).

Vegetation Description

Betula nana usually dominates the shrub layer; Vaccinium uliginosum, Ledum decumbens (Ledum palustre L. ssp. Decumbens), Salix pulchra, S. barclayi or other Salix spp. may also be common or occasionally dominant (Viereck 1979, Viereck et al. 1992, NatureServe 2008). Dwarf shrubs such as Empetrum nigrum and Vaccinium vitis-idaea may be common under the low shrub layer. Herbaceous species are sparse, but may include Festuca altaica and Hierochloe alpina. Feathermoss (Hylocomium splendens and Pleurozium schreberi) and lichens are common, but peat-forming mosses and sedges are not common (Viereck et al. 1992, NatureServe 2008).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BENA | Betula nana | Dwarf birch |
| VAUL | Vaccinium uliginosum | Bog blueberry |
| LEPAD | Ledum palustre ssp. decumbens | Marsh labrador tea |
| SAPU15 | Salix pulchra | Tealeaf willow |
| SABA3 | Salix barclayi | Barclay's willow |
| EMNIN | Empetrum nigrum ssp. nigrum | Black crowberry |
| VAVI | Vaccinium vitis-idaea | Lingonberry |
| HYSP70 | Hylocomium splendens | Splendid feather moss |

Disturbance Description

The following information was taken from the draft Boreal Ecological Systems description (NatureServe 2008):

This system represents a topoedaphic climax in some areas, in other cases it may be seral to shrub-tussock over long time periods (Viereck et al. 1992).

There is little information available about the fire history of shrub communities in AK. Birch and ericaceous shrub tundra tends to produce more severe burns than sedge-shrub tussock tundra (Racine 1979). After fire, shrubs resprout readily from underground propagules if they have not been burned, and a shrub community re-establishes on the site within five years. After severe fires that remove the organic layer and burn the propagules, herbaceous species that establish by seed may dominate the site for more than five years. Burned-over spruce woodlands near treeline may be converted to low shrub after fire (Pegau 1972) and may slowly regenerate a spruce overstory. The fire return interval is longer in the Sub-boreal region than in boreal AK. Adjacent vegetation influences the fire frequency. If the adjacent vegetation is flammable, then the low shrub type will have a more frequent fire return. Fire return intervals are long, likely greater than 100 yrs. Trees may also invade these shrublands but over long time frames.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Min FI** | **Max FI** | **Percent of All Fires** |
| Replacement | 300 |  |  | 100 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| **All Fires** | **300** |  |  | **100** |

Scale Description

Large patch

Non-Fire Disturbances

Adjacency or Identification Concerns

At treeline, this system occurs above the Western North American Boreal Treeline White Spruce Woodland - Alaska Sub-boreal (NatureServe 2008)

Sites dominated by non-riparian or non-wetland Salix spp. are included in this type (NatureServe 2008). Low shrub types on peat deposits are included in the wetland types (NatureServe 2008).

Issues or Problems

The probability for fire in the state-and-transition model is a best guess, not based on literature.

Native Uncharacteristic Conditions

Comments

More information on this type can be found in the Fire Effects Information System (FEIS) Synthesis: [Fire regimes of Alaskan alder and willow shrublands](http://www.fs.fed.us/database/feis/fire_regimes/AK_alder_shrub/all.html) (Innes 2015). In 2015 an extensive search was done by FEIS staff to locate information for a synthesis on Fire regimes of Alaskan alder and willow shrublands. At that time, the scientific literature about fire regimes in Alaskan alder and willow shrublands was scarce. Anecdotal and qualitative descriptions are used in this synthesis to supplement the limited quantitative literature. Descriptions of fire ignition, season, pattern, and size specific to alder and willow shrublands were not found in the literature.

This model was based on the Western North American Boreal Mesic Scrub Birch-Willow Shrubland - Boreal model created by Jennifer Allen. Kori Blankenship and Tina Boucher increased the MFRI for the Sub-boreal variant of the model and made minor edits to the description. This model was created for the AK sub-boreal region and did not receive review during LANDFIRE National for other parts of the state.

**Model Parameters**

*Using Track Changes in Word you may suggest changes to any of the parameters indicated in the following tables. If you wish to see how those changes impact model results, go to the “Simulation Model Review Instructions” section on* <http://www.landfirereview.org/models.html>*. If you do not wish to edit and run the actual model, the TNC LANDFIRE will do so and if requested provide the reviewer with the results.*

**Deterministic Transitions**

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Late1:ALL | 4 |
| Late1:ALL | 5 | Late1: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** |
| ReplacementFire | Early1:ALL | Early1:ALL | 0.0033 | 303 | No | 0 |
| ReplacementFire | Late1:ALL | Early1:ALL | 0.0033 | 303 | Yes | 0 |

Succession Classes

Class A 5 Early Development 1 - All Structures

Structural Information

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| FEAL | Festuca altaica | Altai fescue | Upper |
| HIAL3 | Hierochloe alpina | Alpine sweetgrass | Upper |

Description

After fire, herbaceous species such as Festuca altaica and Hierochloe alpina typically dominate. This class may persist for more than five years if fire severity is high enough to remove the organic layer.

Class B 95 Late Development 1 - All Structures

Structural Information

Tree Size Class: None

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BENA | Betula nana | Dwarf birch | Upper |
| VAUL | Vaccinium uliginosum | Bog blueberry | Upper |
| LEPAD | Ledum palustre ssp. decumbens | Marsh labrador tea | Upper |
| SALIX | Salix | Willow | Upper |

Description

This class is dominated by shrubs, often Betula nana. Betula glandulosa, Vaccinium uliginosum, Ledum decumbens, Salix pulchra, S. barclayi or other Salix spp. may also be common (Viereck 1979, Viereck et al. 1992). Dwarf shrubs such as Empetrum nigrum and Vaccinium vitis-idaea may be common under the low shrub layer. Trees may invade the shrubland over long time frames.

References

Hulten, E. 1966. Contributions to the knowledge of flora and vegetation of the southwestern Alaskan mainland. Sven. Bot. Tidskr. 60(1): 175-189.

Innes, Robin J. 2015. Fire regimes of Alaskan alder and willow shrublands. 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\_alder\_shrub/all.html [ 2016, August 3].

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

Pegau, R.E. 1972. Caribou investigations-analysis of range. In: Pegau, R.E. and J.E. Hemming (ed.). Caribou report. Volume 12. Progress report. Federal Aid in Wildlife Restoration, Projects W-17-2 and W-17-3, Job 3.3R. Alaska Dept. of Fish and Game, Juneau, AK: 1-216.

Racine. 1979. Climate of the Chucki-Imuruk area. Pages 32-37 in H. R. Melchior, ed., Biological Survey of the Bering Land Bridge National Monument. Alaska Cooperative Park Studies Unit, University of Alaska Fairbanks, Fairbanks, AK.

Viereck, L.A. 1963. Sheep investigations: survey of range ecology. Project W-6-R-4, Work plan E. Job 2-A. Alaska Department of Fish and Game, Juneau, AK.

Viereck, L.A. 1979. Characteristics of treeline plant communities in Alaska. Holarctic Ecology. 2: 228-238.

Viereck, L.A., and Little, E.L. 1972. Alaska Trees and Shrubs. USDA Forest Service Ag. Handbook 410. University of Alaska Press, Fairbanks, Alaska. 265 p.

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