

# LANDFIRE Biophysical Setting Model

**Biophysical Setting 6717030**

**Alaska Arctic Dwarf-Shrub-Sphagnum  
Peatland**

☐ This BPS is lumped with:

☐ This BPS is split into multiple models:

## General Information

**Contributors** (also see the Comments field) **Date** 10/9/2008

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**Modeler 2** Keith Boggs Ankwb@uaa.alaska.edu **Reviewer**  
**Modeler 3** **Reviewer**

### Vegetation Type

Wetlands/Riparian

### Map Zone

67

### Model Zone

- |                                            |                                            |
|--------------------------------------------|--------------------------------------------|
| <input checked="" type="checkbox"/> Alaska | <input type="checkbox"/> N-Cent.Rockies    |
| <input type="checkbox"/> California        | <input type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Basin       | <input type="checkbox"/> South Central     |
| <input type="checkbox"/> Great Lakes       | <input type="checkbox"/> Southeast         |
| <input type="checkbox"/> Northeast         | <input type="checkbox"/> S. Appalachians   |
| <input type="checkbox"/> Northern Plains   | <input type="checkbox"/> Southwest         |

### Dominant Species\*

BENA VAUL  
LEPAD SAPU15  
EMNI SPST3  
CHCA2 SPHAG2

### General Model Sources

- ☐ Literature  
☐ Local Data  
☒ Expert Estimate

## Geographic Range

This BpS is found in arctic AK primarily in the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions (Nowacki et al. 2001).

## Biophysical Site Description

This system occurs on flat permafrost plateaus and raised bogs (Boggs et al. 2008). Soils are poorly drained and acidic, typically with a well-developed peat layer (Boggs et al. 2008). Permafrost is present.

## Vegetation Description

Dwarf and low shrub cover is >25%, Sphagnum spp. cover is >25% and lichen cover is <25% (Boggs et al. 2008). The dominant dwarf-shrubs are Betula nana and Ledum palustre ssp. decumbens (Boggs et al. 2008). Other species include Empetrum nigrum, Chamaedaphne calyculata, Vaccinium uliginosum, Salix pulchra, Spiraea stevenii, Vaccinium vitis-idaea, Arctostaphylos spp., Eriophorum spp., Carex aquatilis, Carex microchaeta and Sphagnum ssp. (Boggs et al. 2008).

## Disturbance Description

This system occurs as a late-seral stage created by permafrost uplift within the thaw pond cycle (described below) and on raised bogs due to organic matter buildup. It likely persists for more than 100yrs and is seral to the permafrost plateau-dwarf-shrub-lichen system; however, experts at the Arctic Modeling Meeting (April 08) recommended modeling it as its own system (i.e. not as a seral stage of the permafrost plateau-dwarf-shrub-lichen system) because of the long duration of the seral stages. It could also develop due to permafrost uplift outside the thaw pond cycle.

The following information was taken from the draft Arctic Ecological Systems description with minor

\*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

\*\*Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100-year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity

modifications (Boggs et al. 2008):

This can be a mid-seral stage in the thaw pond cycle which starts with the collapse of a permafrost plateau resulting in a wet depression often with open water. This is colonized by marsh species or Sphagnum species or a combination of both. Sedges eventually invade, and the wet sedge-Sphagnum system develops. If organic matter buildup or permafrost uplift the surface, then this system may be seral to the Dwarf-Shrub-Sphagnum Peatland system. This system, in turn, may be seral to the permafrost plateau-dwarf-shrub-lichen system. The seral sequence may not be unidirectional, and the timeframe is unclear, possibly taking hundreds of years.

## Adjacency or Identification Concerns

## Native Uncharacteristic Conditions

## Scale Description

Small to large.

## Issues/Problems

## Comments

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).

## Vegetation Classes

### Class A 100 %

Mid Development 1 All Structures

#### Upper Layer Lifeform

- ☐ Herbaceous  
☒ Shrub  
☐ Tree

#### Indicator Species\* and Canopy Position

BENA Upper  
LEPAD Upper  
EMNI Upper  
SPHAG2 Upper

#### Structure Data (for upper layer lifeform)

|                 | Min                             | Max                              |
|-----------------|---------------------------------|----------------------------------|
| Cover           | Open Shrub (25-74% shrub cover) | Closed Shrub (> 75% shrub cover) |
| Height          | Dwarf Shrub (< 20cm)            | Dwarf Shrub (< 20cm)             |
| Tree Size Class | None                            |                                  |

☐ Upper layer lifeform differs from dominant lifeform.

#### Description

Zero plus years

This class represents the Dwarf-Shrub-Sphagnum Peatland system. Refer to the vegetation description for common species.

No disturbances modeled.

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**Class B 0 %**

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous  
☐ Shrub  
☐ Tree

**Indicator Species\* and  
Canopy Position****Structure Data (for upper layer lifeform)**

|                 | Min | Max |
|-----------------|-----|-----|
| Cover           |     |     |
| Height          |     |     |
| Tree Size Class |     |     |

☐ Upper layer lifeform differs from dominant lifeform.**Description****Class C 0 %**

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous  
☐ Shrub  
☐ Tree

**Indicator Species\* and  
Canopy Position****Structure Data (for upper layer lifeform)**

|                 | Min | Max |
|-----------------|-----|-----|
| Cover           |     |     |
| Height          |     |     |
| Tree Size Class |     |     |

☐ Upper layer lifeform differs from dominant lifeform.**Description****Class D 0 %**

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous  
☐ Shrub  
☐ Tree

**Indicator Species\* and  
Canopy Position****Structure Data (for upper layer lifeform)**

|                 | Min | Max |
|-----------------|-----|-----|
| Cover           |     |     |
| Height          |     |     |
| Tree Size Class |     |     |

☐ Upper layer lifeform differs from dominant lifeform.**Description****Class E 0 %**

[Not Used] [Not Used]

**Upper Layer Lifeform**

- ☐ Herbaceous  
☐ Shrub  
☐ Tree

**Indicator Species\* and  
Canopy Position****Structure Data (for upper layer lifeform)**

|                 | Min | Max |
|-----------------|-----|-----|
| Cover           |     |     |
| Height          |     |     |
| Tree Size Class |     |     |

☐ Upper layer lifeform differs from dominant lifeform.**Description****Disturbances**

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**Fire Regime Group\*\*:** NA

**Historical Fire Size (acres)**

Avg 0

Min 0

Max 0

**Sources of Fire Regime Data**

- ☐ Literature  
☐ Local Data  
☒ Expert Estimate

**Additional Disturbances Modeled**

- ☐ Insects/Disease    ☐ Native Grazing    ☐ Other (optional 1)  
☐ Wind/Weather/Stress    ☐ Competition    ☐ Other (optional 2)

**Fire Intervals**

|             | Avg FI | Min FI | Max FI | Probability | Percent of All Fires |
|-------------|--------|--------|--------|-------------|----------------------|
| Replacement |        |        |        |             |                      |
| Mixed       |        |        |        |             |                      |
| Surface     |        |        |        |             |                      |
| All Fires   |        |        |        |             |                      |

**Fire Intervals (FI):**

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

**References**

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

Nowacki, G., P. Spencer, M. Fleming, T. Brock and T. Jorgenson. 2001. Unified ecoregions of Alaska. U.S. Department of the Interior, U.S. Geological Survey. Open file-report 02-297. 2 page map.

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