LANDFIRE Biophysical Setting Model

Biophysical Setting 6717080 Alaska Arctic Polygonal Ground Shrub-Tussock Tundra

☑ *This BPS is lumped with: See below*

☐ *This BPS is split into multiple models: Alaska Arctic Polygonal Ground Mesic Shrub Tundra (BpS 1700) and Alaska Arctic Polygonal Ground Tussock Tundra (BpS 1707)*

General Information

Contributors (also see the Comments field **Date** 10/17/2008

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Modeler 3			**Reviewer**		

Vegetation Type

Upland Shrubland

Map Zone

67

Model Zone

☑ Alaska ☐ N-Cent.Rockies
☐ California ☐ Pacific Northwest
☐ Great Basin ☐ South Central
☐ Great Lakes ☐ Southeast
☐ Northeast ☐ S. Appalachians
☐ Northern Plains ☐ Southwest

Dominant Species*

BENA VAUL
SAPU15 EMNI
LEPAD ERVA4
VAVI CABI5

General Model Sources

☐ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range

This BpS is typically found in the lowland regions of arctic AK, particularly on the Beaufort Coastal Plain ecoregion (Nowacki et al. 2001) in northern AK and the Kotzebue Sound lowlands of west-central AK, but it also occurs in other scattered locations of arctic AK where ice-wedge processes occur.

Biophysical Site Description

Ice-wedge polygons and the thaw lake cycle dominate the Beaufort Coastal Plain ecoregion (Nowacki et al. 2001). The ice-wedge polygons generally occur on level surfaces (0-2 degree slopes), the ice wedges may be 2 m wide at the top, and polygon diameter ranges from several to more than 30 meters. In addition to the Beaufort Coastal Plain, ice-wedge polygons are a common feature on level ground within foothills and mountains, on glacial drift, lacustrine and floodplain terrace surficial deposits. The Polygonal Ground Shrub-Tussock Tundra system occurs primarily on high-center polygons but may also be found on raised areas along drainages, terraces and other mesic flat to slightly sloping sites. Sites dominated by tussocks are generally cold, poorly drained, and underlain by mesic, silty mineral soils. Permafrost is usually present.

Vegetation Description

Polygon centers are mesic and dominated by either tussocks, tussocks and shrubs or only shrubs and lichens, and their perimeters are commonly wet supporting wet sedge. Betula nana and Salix pulchra dominate the shrub layer. Other species include Ledum palustre ssp. decumbens, Vaccinium vitis-idaea, Vaccinium uliginosum, Empetrum nigrum and Cassiope tetragona. Eriophorum vaginatum is the primary tussock-former in most sites, but Carex bigelowii may dominate some sites. Calamagrostis canadensis,

*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 seve

Arctagrostis latifolia and Chamerion latifolium may be common. Common mosses include Sphagnum spp., Polytrichum strictum, Hylocomium splendens and Aulacomnium turgidum. The wet perimeters typically support Carex aquatilis and Eriophorum angustifolium. Lichens may occur.

Disturbance Description

The following paragraph was taken from the draft Arctic Ecological Systems description (Boggs et al. 2008):
Ice wedge polygons are formed by large ice wedges which grow in thermal contraction cracks in permafrost. High center polygons indicate that erosion, deposition or thawing is more prevalent than the up-pushing of the sediments along the sides of the wedge. Ice-wedge polygons are typically part of a spatially coarser thaw lake cycle.

The time scale on this process is long and probably beyond the scope of this modeling effort. Therefore, this system is modeled as a stable, 1-class system.

A reviewer noted that shrubs are probably a late successional stage following tussock tundra on high centered polygons.

Adjacency or Identification Concerns

Native Uncharacteristic Conditions

Scale Description

Small to large patch.

Issues/Problems

Comments

This model was created by Kori Blankenship and Keith Boggs based on the draft Arctic Ecological Systems description (Boggs et al. 2008). Minor additions were made to the description as a result of review comments.

Vegetation Classes

Class A 100 %

Mid Development 1 All Structures

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Indicator Species* and Canopy Position

BENA	Upper
SAPU15	Upper
ERVA4	Upper
CABI5	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)	Low Shrub (20cm to 1.5m)
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Herbs or shrubs can be the upper layer lifeform.

Description

Zero plus years

This class represents the Polygonal Ground Shrub-Tussock Tundra system. Refer to the vegetation description for common species.

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No disturbances modeled.

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

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 fir combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inver 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.

Additional Disturbances Modeled

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

References

Keith Boggs. 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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