

***Artemisia arctica-Trisetum spicatum* Nunatak Plant Association**  
Boreal Sagebrush-Spike Trisetum Nunatak Plant Association  
Southern Alaska

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**Conservation Status Rank:** G3 S3 (vulnerable)

***Introduction***

The *Artemisia arctica-Trisetum spicatum* (boreal sagebrush-spike trisetum) Nunatak Plant Association is a late-seral, herbaceous type occupying high-alpine sites in a periglacial environment (Figure 1). Impacts are generally low.



Figure 1. The *Artemisia arctica-Trisetum spicatum* Nunatak Plant Association in Kenai Fjords, Alaska.

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***Distribution***

This plant association occurs as small patches in high alpine sites of southern Alaska. It has been sampled on the Kenai Peninsula and Lake Clark National Park and Preserve (Miller et. al. 2006), and occurs the Juneau Ice Field (Heusser 1954), and southeastern Wrangell Mountains (Scott 1974) and likely in other coastal mountain ranges. The distribution of this plant association was developed from mapping alpine (over 1,000m) habitats that are completely surrounded by glacial ice (GLIMS 2005). Four occurrence records represent herbaria collections of either *Artemisia arctica* or *Trisetum spicatum* within this range of

distribution (CPNWH 2016, Figure 2).

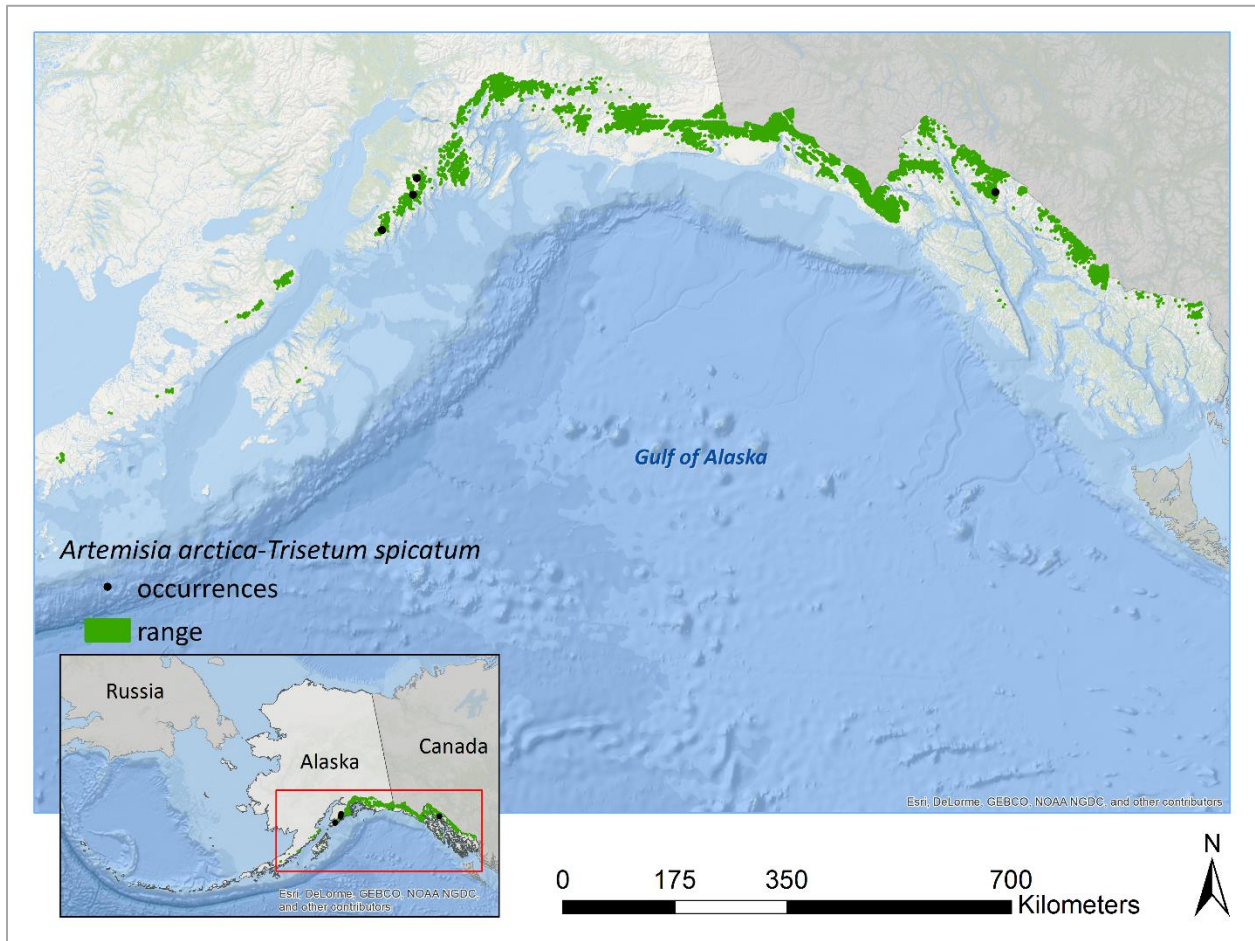


Figure 2. Distribution of the *Artemisia arctica-Trisetum spicatum* Nunatak Plant Association. Note that the areas of occurrence in this map are buffered for greater visibility.

### **Climate**

Southern Alaska has a cool, wet maritime climate and is generally free of permafrost (Gallant et al. 1995, Nowacki et al. 2001). Mean annual precipitation ranges from 135 to 390 cm with 80 to 600 cm falling as snow. Average summer temperatures range from 7 to 18 °C; average winter temperatures are between -3 and 3°C.

### **Environmental Characteristics**

This association occurs on alpine ridges, nunataks and sideslopes at elevations that are typically greater than 1,000 m (Figure 3). Depending on landform, slopes range from 2 to 40 degrees. These sites experience high winds and deep snows; soils may freeze in winter but permafrost does not occur. Exposed bedrock and surface rock are common. Sites are dry to mesic with a soil pH of 5.2. The soils are typically silt, sand, and angular gravel over bedrock.

### **Vegetation**

Due to the high cover of exposed rock, total vascular plant cover may be less than 25%. Species composition is variable but often includes *Artemisia arctica*, *Salix rotundifolia*, *Carex microchaeta*, *Trisetum spicatum*, *Astragalus alpinus*, *Minuartia arctica*, *Saxifraga bracteata*, *S. bronchialis*, *Sibbaldia procumbens* and

*Silene acaulis*. Common nonvascular genera include moss and lichen species in the *Racomitrium* and *Stereocaulon* genera, respectively. This association cooccurs with other high alpine associations in the region, including *Salix rotundifolia*/*Carex microchaeta*, *Carex microchaeta* and *Luzula wahlenbergii* (DeVelice et al. 1999). Based on soil development, this association likely represents a late-seral stage.



Figure 3. The *Artemisia arctica*-*Trisetum spicatum* Nunatak Plant Association in Kenai Fjords, Alaska.

### **Conservation Status**

**Rarity:** Within Southeast Alaska, nunataks are estimated to occupy 2,900 km<sup>2</sup>. Within this potential range, four occurrences of the *Artemisia arctica* – *Trisetum spicatum* association have been documented. This association is known only from Alaska.

**Threats:** Owing to its remote, alpine location, impacts are assumed to be low; however climate warming may promote the colonization of species from more temperate, lower elevation sites.

**Trend:** Short- and long-term increases in extent are predicted due to ice melt and expansion of nunatak habitat.

### **Species of Conservation Concern**

The plant species listed below are designated critically imperiled or vulnerable either globally (G1-G3) or within Alaska (S1-S3) and are known or suspected to occur in this plant association (Table 1). Please visit the Alaska Center for Conservation Science website for species descriptions (ACCS 2016). Additional study is required to evaluate whether this plant association supports animal species of conservation concern.

Table 1. Plant species of conservation concern within the *Artemisia arctica-Trisetum spicatum* Nunatak Plant Association.

Scientific Name	Global Rank	State Rank	Habitat Description
<i>Douglasia laevigata</i>	G3	S2S3	Grows in rock crevices on vertical faces of basalt cliffs, rock outcrops and talus slopes, from mountain ridges to coastal bluffs.
<i>Draba incerta</i>	G5	S3	Rock outcrops, talus, gravelly areas, tundra.
<i>Micranthes porsildiana</i>	G4	S2	Mineral soil, scree, rock; known to occur on both ultramafic and acidic substrates.
<i>Carex phaeocephala</i>	G4	S3	High-montane to alpine areas, usually rocky soils.

### Classification Concept Source

This association was defined by (Boggs et al. 2008) and is similar to other alpine associations defined by DeVelice et al. (1999).

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