

***Luzula confusa-Sphaerophorus globosus* Plant Association**

Northern Woodrush-Globe Ball Lichen Plant Association

Northern Alaska

Conservation Status Rank: S4 (apparently secure)

Introduction

The *Luzula confusa-Sphaerophorus globosus* (northern woodrush-globe ball lichen) Plant Association is a type codominated by rushes and lichens that also supports a high diversity of arctic plant species. It is common on dry to moist acidic sands and gravels of marine terraces at Barrow but appears to be uncommon elsewhere in Alaska (Webber 1978) (Figure 1). This type is distinguished from the *Luzula confusa-Poa arctica* plant association by its greater abundance of lichens and its somewhat drier, mineral soils.

Distribution

This plant association is described from the Barrow area where it is common along the well-drained, sloping creek banks and marine terraces of Footprint Creek and similar habitats. While it occupies 7% of the International Biological Program (IBP) study area, (Walker and Webber 1974) it is thought to cover only a small portion of the larger region. Due to its patchiness and small area of occupancy, the distribution of this association is difficult to map at the landscape scale. A preliminary distribution of this association was derived from herbarium records and bioclimatic information. Collection locations of either *Luzula confusa* or *Sphaerophorus globosus* (CPNW Herbaria 2016) were compared to remotely-sensed imagery to decide if the occurrence of the species was representative of the association. The intersection of these representative locations with Subzone C of the Circumpolar Arctic Vegetation Map (Raynolds et al. 2006) was used to develop the final distribution map (Figure 2).



Figure 1. The *Luzula confusa-Sphaerophorus globosus* Plant Association on a gravelly marine terrace at Barrow, Alaska (photo by D.A. Walker).

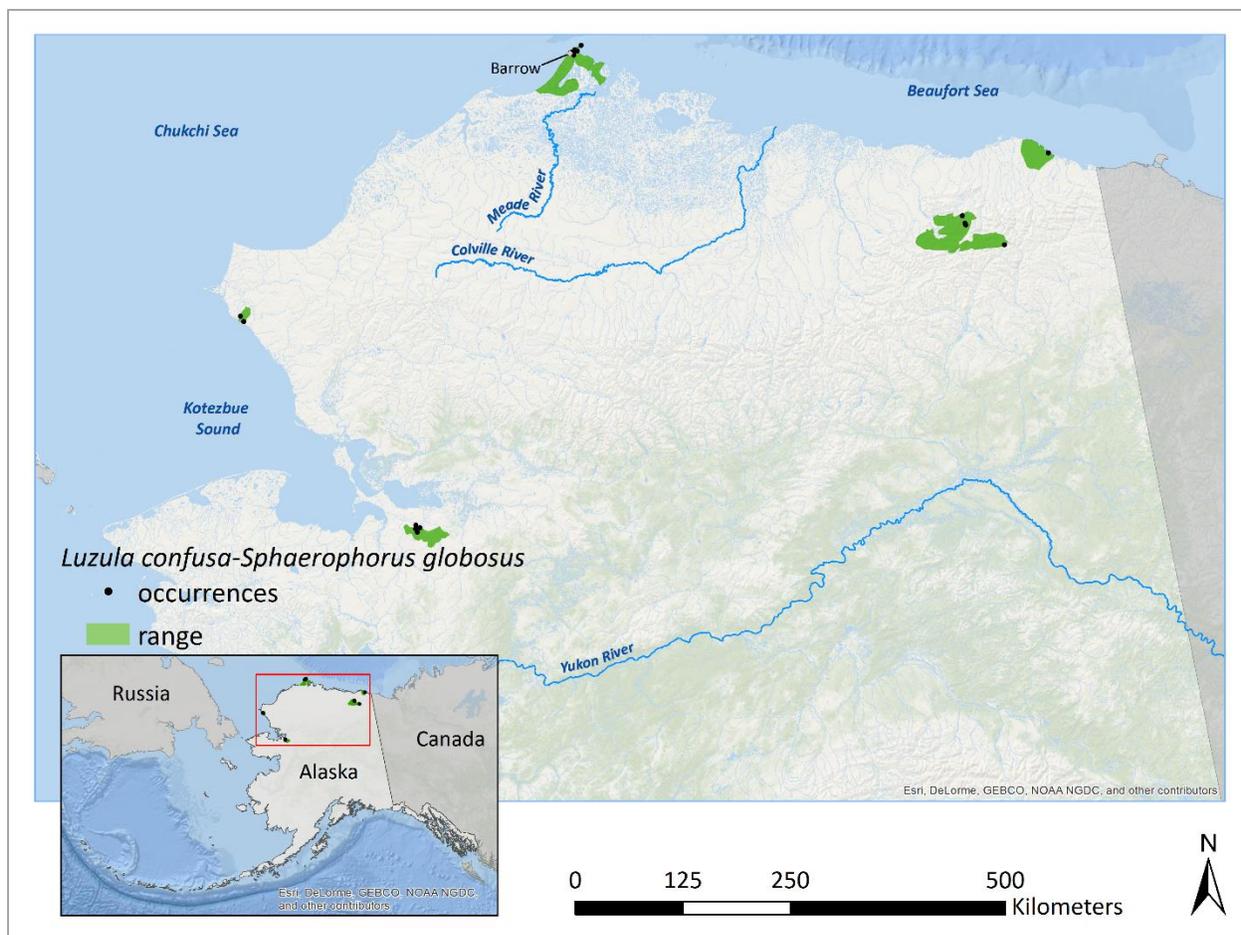


Figure 2. Distribution of the *Luzula confusa-Sphaerophorus globosus* Plant Association. Note that point occurrences in this map have been buffered for greater visibility.

Climate

In the northern Alaska region, the arctic climate is dry and cold, characterized by very short summers and long winters (USDA, Natural Resources Conservation Service, 2006). The mean annual precipitation ranges from about 10 to 26 cm. Annual precipitation mostly falls as snow during the long winter season. The average annual temperature ranges from -13 to -6 °C, and freezing temperatures can occur in any month. Summers are frequently foggy because of close proximity to the Arctic Ocean. June, July and August annually receive the highest average precipitation, with August receiving an average of 3.3 cm precipitation. The average annual temperature ranges from -13 to -6 °C, and freezing temperatures can occur in any month. Summers are frequently foggy because of close proximity to the Arctic Ocean. The northern part of the Arctic Coastal Plain, is classified as bioclimatic Subzone C, which has a mean July temperature of 7°C (Walker et al. 2005), which limits the growth of shrubs hemiprostrate forms. (Raynolds et al. 2006).

Environmental Characteristics

This plant association occurs on dry, exposed sites typically along well-drained, sloping creek banks and marine terraces. Soils are acidic, gravelly or sandy coastal tundra.

Vegetation

This plant association has high cover of lichens and sparse vascular plant cover (Figure 3). Common lichens include *Alectoria nigricans*, *Sphaerophorus globosus*, *Bryocaulon divergens*, *Dactylina arctica*, *Cladonia*, *Cetraria* and *Ochrolechia* species as well as *Thamnolia vermicularis*. Vascular cover is characterized by high constancy of the rushes *Luzula confusa* and *L. arctica*, the grasses *Arctagrostis latifolia* and *Anthoxanthum monticola* and a diversity of forbs such as *Potentilla hyparctica*, *Pedicularis lanata*, *Saxifraga nelsoniana*, *Draba* species, *Eutrema edwardsii*, *Papaver macounii*, *Polygonum viviparum*, *Rumex arcticum* and *Senecio atropurpureus*. The dwarf shrub *Salix rotundifolia* is usually abundant (Figure 4). Bryophyte species include *Dicranum elongatum*, *Brachythecium* species, *Drepanocladus uncinatus*, *Gymnomitrium coralloides*, *Pogonatum alpinum* and *Polytrichum strictum*. The community has high richness ranging from 70 to 82 species (Webber 1978, Elias et al. 1996).



Figure 3. The *Luzula confusa*-*Sphaerophorus globosus* Plant Association showing the lichen covered surface and forbs, including *Papaver hultenii* and *Potentilla hyparctica* (photo by D.A. Walker)

Conservation Status

Rarity: The *Luzula confusa*-*Sphaerophorus globosus* association is common in the Barrow area and similar habitats elsewhere in northwestern Alaska; 29 possible occurrences have been documented.

Threats: Threats include climate change in so far that warming could thaw the presumably ice-rich soils that support this association. Additional threats include anthropogenic disturbances such as village and oil and gas development as well as snow machine and all-terrain vehicle traffic.

Trend: Short-and long-term declines related to thermokarst and coastal erosion (for nearshore locations) are expected for this association.

Species of Conservation Concern

The bird, mammal, and 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, Table 2). Please visit the Alaska Center for Conservation Science webpage for species descriptions (ACCS 2016).

Table 1. Mammal and bird species of conservation concern within the *Luzula confusa* – *Sphaerophorus globosus* Plant Association.

Common Name	Scientific Name	Global Rank	State Rank	Habitat Description
Mammals				
Polar bear	<i>Ursus maritimus</i>	G3G4	S2	Polar bears are known to use inland habitat for denning. Coastal areas of this plant association likely provide seasonal habitat for polar bears.
Birds				
Bar-tailed Godwit	<i>Limosa lapponica</i>	G5	S3B	Nests in sedge meadows and coastal tundra. Staging in nearshore estuarine areas and beaches.
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	G4	S2B	Nests on tundra. Rare Arctic coastal breeder.
Hudsonian Godwit	<i>Limosa haemastica</i>	G4	S2S3B	Nests on grassy tundra, near water – bogs, marshes, coastal or riverine areas. Nonbreeding habitat includes marshes, beaches, flooded fields, and tidal mudflats (AOU 1983); lake and pond shores, inlets.
King Eider	<i>Somateria spectabilis</i>	G5	S3B, S3N	Known to nest in arctic coastal tundra.
Red Knot	<i>Calidris canutus</i>	G5	S2S3B	Nests on ground of barren tundra and well vegetated moist tundra in Northwest Alaska including the Seward Peninsula and less commonly near Point Barrow.
Red-necked Stint	<i>Calidris ruficollis</i>	G5	S3B	Breeds on swampy or mossy tundra, especially with scattered willow scrub (AOU 1983).
Sanderling	<i>Calidris alba</i>	G5	S2B	Breeds in small area of high arctic tundra on the Arctic Coastal Plain near Barrow.
Snowy Owl	<i>Bubo scandiacus</i>	G5	S3S4	Breeds in tundra from near treeline to the edge of polar seas.
Spectacled Eider	<i>Somateria fischeri</i>	G2	S2B	Molting occurs in nearshore waters containing an abundance of mollusks. Nests primarily in lowland wetlands on coastal tundra.
Steller's Eider	<i>Polysticta stelleri</i>	G3	S2B, S3N	During molting, utilize tidal flats and deeper bays. Winter habitat includes eelgrass, intertidal sand flats, and mudflats possibly foraging on invertebrates.
Stilt Sandpiper	<i>Calidris himantopus</i>	G5	S3B	Breeding range from Canadian border to Barrow, Alaska along coastal plain at least several km inland. Suspected to use nearshore marine habitat for migration.
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	G5	S3B	Grassy or mossy tundra, often not far from water; wet tundra, with nest sites on tops of hummocks.

Common Name	Scientific Name	Global Rank	State Rank	Habitat Description
Yellow-billed Loon	<i>Gavia adamsii</i>	G4	S2B, S2S3N	Nearshore protected seawater habitat used for migration and molting. Nests on tundra near lakes and coastal areas.



Figure 4. The *Luzula confusa*-*Sphaerophorus globosus* Plant Association showing the dwarf shrub, *Salix rotundifolia*, abundant lichens, the forb *Pedicularis lanata*, and graminoids *Arctagrostis latifolia*, and *Luzula confusa* (photo by D.A. Walker).

Table 2. Plant species of conservation concern within the *Luzula confusa*-*Sphaerophorus globosus* Plant Association.

Scientific Name	Global Rank	State Rank	Habitat Description
<i>Cardamine microphylla</i>	G3G4	S2	Floodplains, stream banks, river bars, river terraces, bog shores, alpine slopes.
<i>Draba micropetala</i>	GNR	S1S2	Creek and stream banks, beach ridges.
<i>Draba pauciflora</i>	G4	S2	Beach ridges, boulder slopes, high-center polygons, broad troughs, seepage slopes.
<i>Draba subcapitata</i>	G4	S1S2	Occurs in graminoid-herbaceous meadows and ericaceous heath of coastal bluffs, river bars, pingos, and hummocks.
<i>Papaver gorodkovii</i>	G3	S2S3	Associated with sparsely vegetated habitats on river floodplains, gravel bars, volcanic scree, basalt bedrock and polygon tundra.
<i>Ranunculus sabinei</i>	G4	S1	Tundra slopes, hummocks, estuary banks; all occurrences near coast.
<i>Saxifraga rivularis</i> ssp. <i>arctolitoralis</i>	G5T2T3	S2	Occurs in wet meadows near arctic seashores.

Classification Concept Source

The classification concept for this plant association is based on the Mesic *Salix rotundifolia* heath described by Webber (1978). The similar associations of *Salix rotundifolia*, *Arctagrostis latifolia*, *Alectoria nigricans*, and the *Sphaerophorus globosus*-*Luzula confusa*, subtype *Salix rotundifolia* are described by Walker (1977) and Elias and others (1996), respectively.

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