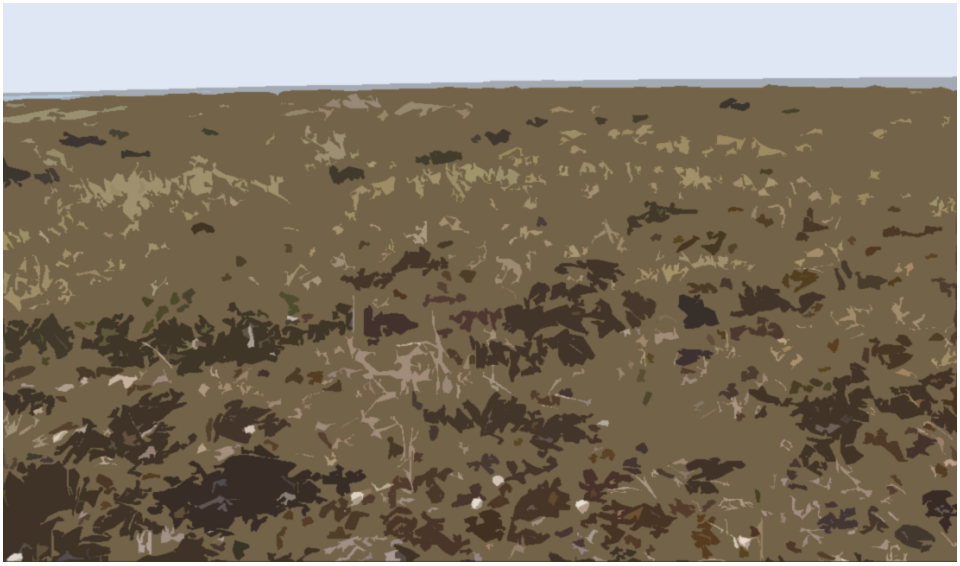
Plant Association Classification for Northern Alaska



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Introduction

This classification describes Plant Associations that occur from the crest of the Brooks Range in Alaska north to the Arctic Ocean, but does not include the Arctic National Wildlife Refuge. Plant Association is the finest scale vegetation community classification, and is defined as "a plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy" (Flahault and Schroter 1910). It is equal to the finest hierarchical level of both The Alaska Vegetation Classification (Viereck et al. 1992) and the US National Vegetation Classification Standard (Federal Geographic Data Committee 2008). Plant Associations are considered taxonomic in nature because they are repeatable across the landscape, much as soils are taxonomically based and repeatable across the landscape. Each association represents a relatively narrow segment of the variation in vegetation communities across the study area. Plot data making up an association at times is consistent in structure and composition, whereas other associations are highly variable, each plot appearing on a continuum.

We list 86 Plant Associations in the Key, of which 77 are described in this document. Raynolds et al. (2006) had previously summarized the remaining nine associations and we provide a web link to these descriptions. http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
Some Plant Associations are based on very few sampling plots and we used the term "provisional" after their name indicating that these findings need future corroboration.

We also chose to use the stand types (i.e. Plant Associations) described by Walker (1987) on pingos in the central Coastal Plain.

Methods

Plant Associations were defined using 394 plots from the following sources:

- 111 plots collected on the north side of Gates of the Arctic National Park and Preserve by AKNHP-UAA
- 10 plots collected on the north side of the Arctic National Wildlife Refuge (ANWR) by ANWR ecologists
- 73 plots collected in the National Petroleum Reserve for the BLM Assessment, Inventory and Monitoring Strategy
- 200 plots collected across the North Slope west of ANWR for this project

Field Work
The 200 plots collected for this project used the following field methods. The field work was based out of Wainwright in 2008, Toolik Lake and Deadhorse in 2010, and Point Hope in 2011. We used a helicopter for transportation and its range was approximately 75 miles around each of these locations. We also used a car to sample along the Dalton Highway in 2010.

The first step was to identify transects to sample in the field that represented the range in variability of landcover and Plant Associations. We chose transect locations using an existing ecotype (landcover) map of the region (Jorgenson 2003). For each ecotype we attempted to sample five or more plots. Transect locations were subjectively chosen based on accessibility

and the weather. Along each transect, polygons representing a transect's range in variation in landcover and Plant Associations were identified for sampling. Transects were typically between 1 and 3 km long. In the mountains, a transect stretched from ridge top to valley bottom. In rolling hills or level physiography, transects that encompassed the full environmental variability were often too long to fully sample. Consequently, we made discontinuous transects with different transect sections falling in each distinct environment to be sampled.

The purpose of collecting ground data was to provide the required information to describe Plant Associations, and to provide species and site information for landcover class descriptions. In 2008, 2010 and 2011, crews of two personnel (AKNHP and BLM staff) sampled 200 plots. A crew was let off at a transect by car or helicopter and walked the general direction of the transect. Selection of Plant Associations to sample along the transect was similar to the approach termed "subjective sampling without preconceived bias" as described by Mueller-Dombois and Ellenberg (1974). We based site selection on homogeneous vegetation, and sites were not chosen with regard to their position in any classification, extant or envisioned, or by applicability to specific management considerations.

We used a single 10 by 10 meter plot to sample each Plant Association, but altered the plot size for narrow or small associations. A field form was used to record Plant Association information. On the form, we recorded vascular and nonvascular species information. In most plots, we recorded a full species list, however, if time was insufficient we recorded only the dominant species from each structural layer. Canopy cover was ocularly estimated (Brown 1954) for each species and could sum to greater than 100%. We estimated canopy height and strata for the dominant species. Site variables included slope, aspect, landform, hydrologic regime, and biome. We dug a 40 cm + deep soil pit in each plot and recorded depth of soil peat, A, B and C horizons, soil texture, pH at 10 cm depth, depth to permafrost and depth to water. Other variables included GPS point, polygon code, landcover class name, date, surveyors, digital photos, and environmental and disturbance comments. All data were entered into an ACCESS database.

Data Analysis

Plant Associations for our study area were determined using a stepwise procedure of successive approximations (Pfister and Arno 1980). We created association tables of the preliminary dominance-type groupings using the species and cover data. We developed a dichotomous key by successive approximation of the associations. We typically used the presence or absence of the dominant species representing each Plant Association as the indicator species within the key.

A minimum of two plots were typically required when defining a Plant Association. Occasionally we used only one plot to define an association if the association had been previously described or we had observed it multiple times in the field.

Plant Association classifications already developed for Northern Alaska helped direct the determination of Plant Associations for the study area and included the following studies:

- Raynolds M.A., D.A. Walker, H.A. Maier. 2006. Alaska Arctic Tundra Vegetation Map. Scale 1:4,000,000. Conservation of Arctic Flora and Fauna (CAFF) Map No. 2, U.S. Fish

and Wildlife Service, Anchorage, Alaska. We accessed the descriptions at http://www.arcticatlas.org/maps/themes/ak/akComm?commqueryID=24

- Boggs, K., A. Garibaldi, J. Stephens, T. Helt. 1999. Landsat derived map and landcover descriptions for Gates of the Arctic National Park and Preserve. Natural Resource Technical Report NPS/GAAR/NRTR—1999/001. National Park Service, Fort Collins, Colorado.
- Jorgenson, J.C., P.E. Joria, T.R. McCabe, B.E. Reitz, M.K. Raynolds, M. Emers, M.A. Williams. 1994. User's Guide for the land-cover map of the coastal plain of the Arctic National Wildlife Refuge. 46.
- MacKenzie, W.H., C. Kennedy, and A., Degroot. 2014. Arctic Vegetation Associations of the Yukon Territory. Environment Yukon, Whitehorse, Yukon, Canada. [in prep]
- Walker, M.D. 1987. Vegetation and floristics of Pingos, Central Arctic Coastal Plain, Alaska. Dissertation, Botanicae, 149, Stuttgart: J. Cramer. 283 pages.

Due to the low number of plots (4) we sampled on pingos, we chose to use the stand types (i.e. Plant Associations) described by Walker (1987) on pingos in the central Coastal Plain.

Within the Plant Association key we also listed—but did not describe—associations summarized by Raynolds et al. (2006) that we observed in Northern Alaska but did not sample. The following is the web link to these Plant Association descriptions. http://www.arcticatlas.org/maps/themes/ak/akCommList_table1

The naming convention follows the US National Vegetation Classification Standards for units at the Association level (Federal Geographic Data Committee 2008). Each Plant Association name consists of two Latin species names separated by a slash or hyphen. The dominant overstory species is separated from the dominant or diagnostic indicator of the undergrowth by a slash (e.g., *Salix alaxensis/Dryas octopetala* Plant Association). For associations with co-dominant species in the overstory the names are separated by a dash (e.g., *Salix pulchra-Eriophorum vaginatum* Plant Association). In associations where vegetation structure is limited to a single layer, we named associations for the single dominant species (e.g., *Arctophila fulva* Plant Association).

The description of each Plant Association contains:

- **Plots sampled:** number of plots sampled in this Plant Association
- **Rank:** the NatureServe conservation status rank definitions used in this document are displayed below.

Rank	Definition
G1 S1	Critically imperiled because of extreme rarity and / or other factors making it highly vulnerable to extinction.
G2 S2	Imperiled because of rarity and / or other factors making it vulnerable to extinction.
G3 S3	Vulnerable because of rarity or restricted range and / or other factors, even though it may be abundant at some of its locations.
G4 S4	Apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
G5 S5	Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
G#G# / S#S#	Range Rank – A numeric range rank (e.g., G3G4 / S3S4) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type.
GNR SNR	Unranked – Global or subnational conservation status rank not yet assessed.

- **Other studies:** citations for Plant Association if previously described
- **Distribution:** distribution within Northern Alaska
- **Patch size:** Matrix (2,000 to 10,000s ha), Large patch (50-2,000 ha), Small patch (1-50 ha), Linear (typically 0.5 to 100 km long).
- **Elevation:** of plots sampled
- **Slope:** of plots sampled
- **Landform:** of plots sampled
- **Hydrology:** of plots sampled
- **Soil:** brief description based on soil pit profiles
- **Landcover class:** the landcover class or classes the Plant Association occurs in
- **Vegetation:** summary of vegetation data.
- **Constancy Coverage Table:** A tabulation listing the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = <1 % cover. Constancy is defined as the percentage of plots in which a species occurred. Average cover is defined as the average for that species across all plots in the association.

All of the BLM AIM plots and ten Jorgenson et al. (1994) plots were used to describe the various Plant Associations. This included distribution, patch size, elevation, slope, landform, hydrology, soil, and species lists. However, because AIM and Jorgenson et al. (1994) used foliar cover instead of canopy cover, we did not add the species and cover information into the Constancy Coverage tables. The tables, consequently, have constancy values that do not always match the number of plots sampled.

We list and describe the Plant Associations by landcover class.

Plant Associations of Conservation Concern

Most of the Plant Associations that occur within the study area were assigned ranks of secure (G5 S5) due to the low level of anthropogenic disturbance in the study area and within Alaska. However, we assigned the rank of G3 S3 to associations with a high fidelity to uncommon Biophysical Settings (i.e. successional sequences); specifically tidal marshes and inland dunes.

Tidal marsh Plant Associations:
Carex glareosa
Carex subspathacea
Carex subspathacea-Salix ovalifolia
Dupontia fisheri
Puccinellia phryganodes

Inland dune Plant Associations:
Salix glauca
Salix niphoclada-Salix glauca Sparse (Inland Dune)
Deschampsia cespitosa Sparse (Inland Dune)

Key to Plant Associations

Instructions:

1. Use this key for identifying Plant Associations
2. Locate a representative portion of the site in question. The vegetation and environment within the site should be relatively homogeneous.
3. Estimate the canopy cover for all indicator species. The indicator species are those species used in the key.
4. Use the key to identify the Plant Association. Start with the key to "Life Form Groups," couplet number 1.
5. To ensure accuracy, compare the written description of the Plant Association with the composition, structure, and site characteristics of the site. Ocular estimates are not precise measurements, so if the site description does not fit the classification, revisit the key allowing a margin of +/- 5 percent error in the cover cut levels.

As stated earlier, within the Plant Association key we listed—but did not describe—associations defined by Raynolds et al. (2006) that we observed in Northern Alaska but did not sample. There is a web link to these plant community descriptions.

Life Form Groups

1. Total canopy cover of vascular and nonvascular species is ≤ 10% 2
1. Total canopy cover of vascular and nonvascular species is > 10% 3

2. Open water ..... Open Water
2. Bare ground ..... Bare ground

3. Total canopy cover of vascular species is ≤ 25% ..... Sparsely Vegetated and Nonvascular Plant Associations
3. Total canopy cover of vascular species is > 25% (the freshwater aquatic bed and freshwater marsh class may have 10-25% cover) 4

4. Site is a coastal beach, coastal dune, spit or barrier island OR subject to regular to infrequent tidal inundation ..... Coastal (Tidal) Marsh and Marine Beach Plant Associations
4. Site is not a coastal beach, coastal dune, spit or barrier islands OR subject to regular to infrequent tidal inundation 5

5. Site occurs on a pingo ..... Pingo Plant Associations
5. Site not on a pingo 6

6. Total needleleaf or broadleaf tree cover is > 10% ..... Forest Plant Associations (not described in this classification)
6. Total needleleaf or broadleaf tree cover is ≤ 10% 7

7. Tussocks with > 35% cover ..... Tussock Tundra and Tussock Shrub Tundra Plant Associations
7. Tussocks with ≤ 35% cover 8

8. Cover of shrubs is > 25% 9
8. Cover of shrubs is ≤ 25% ..... Herbaceous Plant Associations

9. Cover of shrubs > 20 cm tall is > 25% 10

9. Cover of shrubs > 20 cm tall is ≤ 25%; cover of shrubs ≤ 20 cm tall is > 25% 11

10a. Alder dominates ..... Alder Plant Associations
10b. Willow species dominate ..... Low-tall Willow Plant Associations
10c. Other shrub species dominate ..... Birch Ericaceous Low Shrub Plant Associations

11. Sedge or Equisetum spp. cover > 25% ..... Mesic Sedge-dwarf Shrub Plant Associations
11. Sedge cover is ≤ 25% 12

12. *Dryas* species dominate or co-dominate the dwarf shrub layer .....
..... Dwarf Shrub-*Dryas* Plant Associations
12. *Dryas* species do not dominate or co-dominate the dwarf shrub layer .....
..... Dwarf Shrub-other Plant Associations

Alder Plant Associations

1. Tussocks with > 35% cover ..... *Alnus viridis* ssp. *fruticosa*/*Betula nana*/*Carex lugens*
1. Tussocks with ≤ 35% cover 2

2. Site is on a side-slope ..... *Alnus viridis* ssp. *fruticosa*/*Vaccinium uliginosum*
2. Site an active or inactive floodplain or active dune 3

3. Site is on an active dune ..... *Alnus viridis* ssp. *fruticosa/Ribes triste*
3. Site is on an active or inactive floodplain 4

4. *Arctagrostis latifolia* with >10% cover ..... *Alnus viridis* ssp. *fruticosa*/*Arctagrostis latifolia*
4. Not as above: Walker et al. (1997) also defined the following association .....
..... *Alnus viridis-Boschniakia rossica* subtype *Salix richardsonii*
..... Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1

Low and Tall Willow Plant Associations

1. *Salix richardsonii* dominates the low and tall shrub layer 2
1. Other shrub species dominate the low and tall shrub layer 4

2. *Carex aquatilis* and/or *Eriophorum angustifolium* with > 25% cover .....
..... *Salix richardsonii/Eriophorum angustifolium*
2. *Carex aquatilis* and/or *Eriophorum angustifolium* with ≤ 25% cover 3

3. *Carex membranacea* with > 25% cover ..... *Salix richardsonii/Carex membranacea*
3. *Carex membranacea* with ≤ 25% cover ..... *Salix richardsonii/Arctous rubra-Salix reticulata*

4. *Salix pulchra* dominates the low and tall shrub layer 5
4. Other shrub species dominate the low and tall shrub layer 6

5a. Total sedge cover > 25% and *Eriophorum angustifolium* dominates .....
..... *Salix pulchra/Eriophorum angustifolium*
5b. Total sedge cover > 25% and *Carex aquatilis* dominates OR *Sphagnum* with > 40% cover .....
..... *Salix pulchra/Carex aquatilis*
5c. *Eriophorum angustifolium*, *Carex aquatilis* OR *Sphagnum* do not dominate .....
..... *Salix pulchra/Hylocomium splendens*

6. *Salix arbusculoides* with > 10% cover and on an active or inactive floodplain ..... *Salix arbusculoides*

6. *Salix arbusculoides* with ≤ 10% cover or not on a floodplain..... 7

7. *Salix glauca* dominates the low and tall shrub layer 8
7. Other shrub species dominate the low and tall shrub layer 9

8. Occurs on sites with sandy substrates including bluffs, dunes and floodplains ..... *Salix glauca*
8. Not on sandy substrates; typically a colluvial side-slope and *Vaccinium uliginosum* or *Betula nana* are co-dominant with *Salix glauca*..... *Salix glauca-Vaccinium uliginosum*

9. *Salix niphoclada* dominates the low and tall shrub layer ..... *Salix niphoclada*
9. Other shrub species dominate the low and tall shrub layer 10

10. *Salix alaxensis* dominates the low and tall shrub layer 11
10. Other shrub species dominate the low and tall shrub layer .....Unclassified association

11. *Dryas octopetala* or *Dryas integrifolia* with > 10% cover.....*Salix alaxensis/Dryas octopetala*
11. *Dryas octopetala* and *Dryas integrifolia* with ≤ 10% cover ..... *Salix alaxensis*

Birch Ericaceous Low Shrub Plant Associations

1. *Betula nana* dominates or co-dominates the shrub layer..... 2
1. *Betula nana* does not dominate or co-dominate the shrub layer 3

2. Total fruticose lichen cover > 40% .....*Betula nana*/*Cladina rangiferina*
2. Total fruticose lichen cover ≤ 40% .....*Betula nana/Rhododendron tomentosum*

3. *Vaccinium uliginosum* dominates or co-dominates the shrub layer .....
.....*Vaccinium uliginosum/Dryas octopetala*
3. *Rhododendron tomentosum* dominates or co-dominates the shrub layer .....
..... *Rhododendron tomentosum/Vaccinium vitis-idaea*

Tussock Tundra and Tussock Shrub Tundra Associations

1. *Alnus viridis* ssp. *fruticosa* with > 25% cover .....
.....*Alnus viridis* ssp. *fruticosa*/*Betula nana/Carex lugens*
1. *Alnus viridis* ssp. *fruticosa* with ≤ 25% cover 2

2a. *Dryas integrifolia* cover > 25%.....
.....See the *Dryas integrifolia-Carex lugens* Plant Association description in Groot et al. (2014)
2b. In the overstory, combined cover of *Betula nana*, *Rhododendron tomentosum*, *Vaccinium uliginosum* and *Salix pulchra* is > 25%..... 3
2c. In the overstory, combined cover of *Betula nana*, *Rhododendron tomentosum*, *Vaccinium uliginosum* and *Salix pulchra* is ≤ 25%..... 5

3. *Salix pulchra* dominates or co-dominates ..... *Salix pulchra/Eriophorum vaginatum*
3. *Betula nana, Rhododendron tomentosum* and *Vaccinium uliginosum,* individually or in combination, dominate the shrub layer 4

4. *Eriophorum vaginatum* dominates or co-dominates .....
..... *Betula nana/Eriophorum vaginatum*
4. *Carex lugens* dominates .....*Betula nana/Carex lugens*

5. *Eriophorum vaginatum* dominates or co-dominates the overstory.....

.....*Eriophorum vaginatum/Rhododendron tomentosum*
5. *Carex lugens* dominates the overstory ..... *Carex lugens/Salix reticulata*

Mesic Sedge-dwarf Shrub Tundra Plant Associations
1. *Equisetum arvense* cover > 25% ..... *Equisetum arvense*/*Salix reticulata*
1. *Equisetum arvense* cover ≤ 25% 2

2. *Carex lugens* cover > 25%, ... 3
2. *Carex lugens* cover ≤ 25% and *Carex aquatilis* cover > 25%.....*Carex aquatilis*/*Vaccinium vitis-idaea*

3a. *Dryas octopetala* cover > 15%..... *Carex lugens/Dryas octopetala*
3b. *Dryas integrifolia* and *Carex lugens* co-dominate .....
.....*Carex bigelowii-Dryas integrifolia* subtype *Carex membranacea*
Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
3c. Other dwarf shrubs dominate with cover > 25%.....*Carex lugens*/*Vaccinium vitis-idaea*

Dwarf Shrub-*Dryas* Plant Associations
1. *Dryas octopetala* dominates or co-dominates the shrub layer..... 2
1. Other shrubs dominate the shrub layer; *Dryas integrifolia* cover > 10%..... 3

2. Other dwarf shrubs, individually or combined, co-dominate with *Dryas octopetala* .....
.....*Dryas octopetala-Cassiope tetragona*
2. Other dwarf shrubs, individually or combined, are not co-dominate with *Dryas octopetala* .....
.....*Dryas octopetala-Salix phlebophylla*

3a. Occurs on an active, inactive or ancient floodplain terrace.....
.....*Dryas integrifolia-Salix reticulata* (Floodplain)
3b. *Dryas integrifolia* and *Diapensia lapponica* co-dominate; on dry stabilized dune crests in sand sheet region.....*Dryas integrifolia-Diapensia lapponica*
Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
3c. Occurs in hills or mountains on side-slope or ridge .....*Dryas integrifolia* (Upland)
3d. Elias et al. (1996) also defined the following association ..... *Dryas integrifolia-Ochrolechia frigida*
.....Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
3e. Walker et al. (1994) also defined the following association .....
..... *Cassiope tetragona-Dryas integrifolia* subtype *Novosieversia glaciale*
.....Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1

Dwarf Shrub-other Plant Associations
1a. *Arctous rubra* dominates or co-dominates the shrub layer .....*Arctous rubra-Carex aquatilis*
1b. *Cassiope tetragona* dominates or co-dominates the shrub layer.....
.....*Cassiope tetragona-Vaccinium uliginosum*
1c. *Rhododendron tomentosum* dominates or co-dominates the shrub layer.....
.....*Rhododendron tomentosum-Vaccinium vitis-idaea*
1d. *Salix arctica* dominates or co-dominates the shrub layer..... *Salix arctica-Salix polaris*
1e. *Salix phlebophylla* dominates or co-dominates the shrub layer.....*Salix phlebophylla-Carex lugens*
1f. *Salix rotundifolia* dominates or co-dominates the shrub layer.....*Salix rotundifolia*
1g. *Vaccinium uliginosum* dominates or co-dominates the shrub layer .....
.....*Vaccinium uliginosum*/*Dryas octopetala*
1h. Other dwarf shrubs dominate the shrub layer ..... Unclassified dwarf shrub association

Herbaceous Plant Associations

1. Total vascular species cover ≤ 25% and on active alluvial floodplain bars dominated by *Chamerion latifolium* or *Artemisia alaskana* ..... *Chamerion latifolium-Artemisia alaskana* Sparse (Floodplain) Plant Association
1. Not as above 2

2. *Arctophila fulva* dominates the site; these sites may have ≤ 25% total cover ..... *Arctophila fulva*
2. *Arctophila fulva* does not dominate the site 3

3. *Carex aquatilis* dominates or co-dominates the site; these sites may have ≤ 25% total cover 4
3. *Carex aquatilis* does not dominate or co-dominate the site 5

4a. Total moss cover is > 25% ..... *Carex aquatilis-Eriophorum* spp./*Sphagnum* spp.
4b. Total moss cover is ≤ 25% and *Eriophorum angustifolium* co-dominates ..... *Carex aquatilis/Eriophorum angustifolium*
4c. Total moss cover is ≤ 25%, site is a marsh and *Eriophorum angustifolium* does not co-dominate ..... *Carex aquatilis*

5a. *Eriophorum angustifolium* dominates; these sites may have ≤ 25% total cover ..... *Eriophorum angustifolium*-C*arex spp.*
5b. *Eriophorum chamissonis* dominates ..... *Eriophorum chamissonis-Eriophorum angustifolium*
5c. *Carex rotundata* dominates ..... *Carex rotundata-Eriophorum angustifolium*
5d. Walker and Walker (1996) also defined the following association ..... *Carex rotundata-Salix fuscescens* subtype *Sphagnum lenense* ..... Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
5e. *Carex saxatilis* dominates ..... *Carex saxatilis-Eriophorum angustifolium*
5f. *Carex microchaeta* dominates ..... *Carex microchaeta-Scorpidium* spp.
5g. *Poa arctica* dominates ..... *Poa arctica- Calamagrostis stricta* spp. *inexpansa*
5h. *Trichophorum cespitosum* dominates ..... *Trichophorum cespitosum-Carex rotundata*
5i. *Equisetum variegatum* dominates ..... *Equisetum variegatum-Equisetum arvense*
5j. *Rubus chamaemorus* dominates ..... *Rubus chamaemorus-Polytrichum* spp.
5k. High constancy of *Luzula confusa* and *L. arctica;* coastal ..... *Luzula confusa-Sphaerophorus globosus* ..... Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
5l. High constancy of *Poa arctica, Luzula confusa* and *L. arctica;* coastal ..... *Luzula confusa-Poa arctica* ..... Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1
5m. *Equisetum arvense* dominates; along the coast or slopes above streams ..... *Equisetum arvense-Cochlearia groenlandica* ..... Described at http://www.arcticatlas.org/maps/themes/ak/akCommList_table1

Coastal (Tidal) Marsh and Marine Beach/Beach Meadow Plant Associations

1. *Salix ovalifolia* cover > 25% and *Carex subspathacea* cover > 25% ..... *Carex subspathacea-Salix ovalifolia*
1. Not as above 2

2a. *Puccinellia phryganodes* dominates ..... *Puccinellia phryganodes*
2b. *Carex subspathacea* dominates ..... *Carex subspathacea*
2c. *Carex glareosa* dominates ..... *Carex glareosa*
2d. *Honckenya peploides* dominates ..... *Honckenya peploides*
2e. *Leymus mollis* dominates ..... *Leymus mollis*
2f. *Leymus mollis* co-dominates with *Leymus mollis* var. *maritimus* .....

.....*Leymus mollis-Lathyrus japonicus* var. *maritimus*
2g. *Dupontia fisheri* dominates or co-dominates.....*Dupontia fisheri*
2h. Not as above ..... Unclassified Plant Association

Pingo Plant Associations

1. Dwarf shrubs with > 25% total cover..... 2
1. Dwarf shrubs with ≤ 25% total cover..... 3

2a. *Dryas integrifolia* with > 15% cover and *Oxytropis nigrescens, Thamnolia subuliformis* and *Flavocetraria nivalis* all present.....*Dryas integrifolia-Oxytropsis nigrescens* (Pingo)
2b. *Dryas integrifolia* and *Astragalus umbellatus* co-dominate or *Astragalus umbellatus* sub-dominant..... ..... *Dryas integrifolia-Astragalus umbellatus* (Pingo)
2c. *Dryas integrifolia* with > 15% cover and *Astragalus umbellatus* present..... .....*Dryas integrifolia-Astragalus umbellatus-Carex rupestris* (Pingo)
2d. *Salix rotundifolia* dominates and *Dryas integrifolia* present..... .....*Salix rotundifolia-Dryas integrifolia* (Pingo)
2e. *Cassiope tetragona* and *Dryas integrifolia* each with > 10% cover..... .....*Cassiope tetragona-Dryas integrifolia* (Pingo)
2f. *Vaccinium uliginosum* dominates..... *Vaccinium uliginosum-Salix glauca* (Pingo)

3a. *Saxifraga bronchialis* dominates.....*Saxifraga bronchialis*-Lichen (Pingo)
3b. *Cerastium beerinagianum-Minuartia rubella* co-dominate .... *Cerastium beerinagianum-Minuartia rubella* (Pingo)
3c. *Cerastium beerinagianum, Ranunculus pedatifidus, Papaver lapponicum* and *Draba cinerea* occur ....*Cerastium beerinagianum-Ranunculus pedatifidus* (Pingo)
3d. *Poa glauca* and *Bromus pumpellianus* co-dominate .....*Poa glauca-Bromus pumpellianus* (Pingo)
3e. *Carex rupestris* and *Dryas integrifolia* co-dominate..... ..... *Carex rupestris-Saxifraga oppositifolia* (Pingo)
3f. *Phippsia algida-Saxifraga rivularis* dominates..... *Phippsia algida-Saxifraga rivularis* (Pingo)

Sparsely Vegetated and Nonvascular Plant Associations

1. Occurs on an active or inactive floodplain..... 2
1. Does not occur on a floodplain..... 3

2. *Salix alaxensis* dominates.....*Salix alaxensis* Sparse (Floodplain)
2. *Chamerion latifolium* dominates .....*Chamerion latifolium-Artemisia alaskana* Sparse (Floodplain)

3a. Occurs on an active inland dune, river dune or unstable sandy slopes bordering lakes; willows dominate .....*Salix niphoclada-Salix glauca* Sparse (Inland Dune)
3b. Occurs on inland sand deposit; *Deschampsia cespitosa* dominates ....*Deschampsia cespitosa* Sparse (Inland Dune)
3c. Does not occur on an active inland dune, river dune or unstable sandy slopes bordering lakes 4

4. Occurs on a talus field and the lichen *Umbilicaria* spp. with > 5% cover ....*Umbilicaria* spp. Sparse (Talus Field)
4. Does not occur on a talus field and the lichen *Umbilicaria* spp. with ≤ 5% cover 5

5. Occurs on side-slopes or hill tops: Site chemistry is acidic and *Cassiope tetragona* and *Anthoxanthum monticola* ssp. *alpinum* present ....*Cassiope tetragona – Anthoxanthum monticola* ssp. *alpinum* Sparse (Acidic)

5. Occurs on side-slopes or hill tops: Site chemistry is alkaline and *Saxifraga oppositifolia t*ypically present .....*Dryas octopetala-Saxifraga oppositifolia* Sparse (Alkaline)

Alder Plant Associations

***Alnus viridis* ssp. *fruticosa/Betula nana/Carex lugens* Plant Association**
Siberian alder/Shrub birch/Spruce muskeg sedge Plant Association

Plots sampled: 3
Rank: G4; S4

Alnus viridis ssp. *fruticosa*/*Betula nana*/*Carex lugens* Plant Association on ancient floodplain terrace of Colville River.

Other studies: Same as *Alnus viridis* ssp. *crispa*/*Betula nana/Eriophorum vaginatum* (MacKenzie et al. 2014 [in prep]) and similar to *Alnus viridis* ssp. *crispa/Eriophorum vaginatum* (Boggs and Sturdy 2005).
Distribution: In the Brooks Range Foothills near the Colville River, and ancient floodplain terraces of the Colville River.
Patch size: Small to large
Slope: 0 to 10°
Landform: Ancient floodplain terraces and low angle side-slopes
Hydrology: Mesic to wet
Soil: Tussocks are common and standing water may occur between tussocks. Tussocks form over peat and then mineral soil. Permafrost is shallow and occurs at all sites. The pH ranges from 5.8 to 6.5.
Landcover class: Alder
Vegetation: *Alnus viridis* ssp. *fruticosa* dominates the overstory. *Carex lugens* is the dominant sedge although *Eriophorum vaginatum* may also be common. Tussocks are common. A variety of low shrubs

have high cover including *Betula nana, Rhododendron tomentosum, Salix pulchra* and *Vaccinium uliginosum*. Moss cover ranges from 10-65%, and lichen cover and exposed mineral soil are rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Alnus viridis ssp. *fruticosa*	35	100
Andromeda polifolia	2	33
Arctous rubra	0	33
Betula nana	12	67
Cassiope tetragona	4	67
Dryas octopetala	0	33
Empetrum nigrum	5	100
Rhododendron tomentosum	7	100
Salix glauca	2	33
Salix niphoclada	3	33
Salix pulchra	8	67
Vaccinium uliginosum	12	100
Vaccinium vitis-idaea	5	100
Forb		
Equisetum arvense	2	33
Equisetum scirpoides	0	33
Pedicularis capitata	0	33
Petasites frigidus	0	33
Platanthera obtusata	0	33
Polygonum bistorta	0	67
Rubus chamaemorus	2	33
Tofieldia pusilla	0	33
Graminoid		
Arctagrostis latifolia	2	33
Carex aquatilis	8	33
Carex lugens	17	100
Eriophorum angustifolium	2	33
Eriophorum brachyantherum	13	33
Eriophorum russeolum	0	33
Eriophorum vaginatum	12	33
Lichen		
Flavocetraria cucullata	0	33
Peltigera	0	33
Pleuroclada albescens	3	33
Moss		
Dicranum groenlandicum	3	33
Distichium capillaceum	7	33
Hylocomium splendens	20	67
Moss	10	33
Rhytidium rugosum	3	33
Sphagnum	8	33
Sphagnum warnstorfii	3	33
Tomentypnum nitens	5	33

***Alnus viridis* ssp. *fruticosa/Vaccinium uliginosum* Plant Association**
Green alder/Bog blueberry Plant Association

Plots sampled: 2
Rank: G5; S5

Alnus viridis ssp. *fruticosa*/*Vaccinium uliginosum* Plant Association on slopes above the Colville River.

Other studies: Similar to the *Alnus viridis-Boschniakia rossica* subtype *Carex bigelowii* (alder savannas) (Walker et al. 1997), *Alnus viridis* ssp. *fruticosa*/*Betula nana/Ledum palustre* (MacKenzie et al. 2014 [in prep]), also *Alnus crispa/Vaccinium uliginosum* (Brock and Burke 1980).
Distribution: In the Brooks Range Foothills above the Colville River. Uncommon.
Patch size: Small to large
Slope: 5 to 20°
Landform: Low angle side-slopes and bluffs. This association often occurs with shrub-tussock tundra but on slightly drier conditions with a deeper active layer (MacKenzie et al. 2014 [in prep]).
Hydrology: Mesic
Soil: Thin (8 cm) organic horizon over silt, sand and rock. The one pH measured is 5.8.
Landcover class: Alder
Vegetation: *Alnus viridis* ssp. *fruticosa* dominates the overstory and alder height ranges up to 2 meters tall. A variety of low shrubs are common including *Betula nana, Salix pulchra,* and *Vaccinium uliginosum.* Moss cover ranges up to 30%, and lichen cover and exposed mineral soil are rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Alnus viridis ssp. *fruticosa*	48	100
Betula nana	7	100
Cassiope tetragona	5	50
Dryas octopetala	3	50
Empetrum nigrum	3	50
Rhododendron tomentosum	0	50
Salix alaxensis	1	50
Salix arbusculoides	1	50
Salix pulchra	15	50
Vaccinium uliginosum	20	100
Vaccinium vitis-idaea	5	50
Forb		
Boykinia richardsonii	0	50
Equisetum arvense	0	50
Petasites frigidus	0	50
Polemonium acutiflorum	0	50
Polygonum bistorta	0	50
Pyrola asarifolia	0	50
Saxifraga cernua	0	50
Saxifraga nelsoniana	1	50
Graminoid		
Poa pratensis ssp. *alpigena*	5	50
Moss		
Hylocomium splendens	17	100
Sphagnum	10	50

***Alnus viridis* ssp. *fruticosa/Arctagrostis latifolia* Plant Association (provisional)**
Green alder/Wideleaf polargrass Plant Association

Plots sampled: 1
Rank: GNR; SNR

Alnus viridis ssp. *fruticosa*/*Arctagrostis latifolia* Plant Association (provisional) on active floodplain of the Colville River.

Other studies: Similar to *Alnus crispa/Festuca altaica-Arctagrostis latifolia* (Craighead et al. 1988).
Environment: Uncommon and occurs on the active/inactive floodplain terraces of the Colville River. Patch size is small to large and the slope is 0 to 1°. Sites are mesic or wet when flooded.
Landcover class: Alder
Vegetation: *Alnus viridis* ssp. *fruticosa* dominates the overstory and alder height ranges up to 3 meters. *Empetrum nigrum* and *Arctagrostis latifolia* dominate the understory.

***Alnus viridis* ssp. *fruticosa/Ribes triste* Plant Association (provisional)**
Green alder/Red currant Plant Association

Plots sampled: 1
Rank: GNR; SNR
Other studies: Not previously described.
Environment: It is uncommon and occurs on active river dunes in the Brooks Range. Patch size is small, and soils are mesic and sandy.
Landcover class: Alder
Vegetation: *Alnus viridis* ssp. *fruticosa* dominates the overstory and alder height ranges up to 1.5 meters. *Ribes triste* dominates the understory.

Low–Tall Willow Plant Associations

***Salix alaxensis* Plant Association**
Feltleaf willow Plant Association

Plots sampled: 17
Rank: G5; S5

Salix alaxensis Plant Association on an active stream channel in western Brooks Range.

Other studies: Similar to the *Salix alaxensis/Racomitrium canescens* (Viereck 1970), *Salix alaxensis/Arctous rubra* (Webber et al. 1978), *Salix alaxensis/Astragalus alpinus-Epilobium latifolium* (Webber et al. 1978), *Salix alaxensis-Tanacetum bipinnatum* (Komárková and Webber 1980), *Salix alaxensis/Calamagrostis* spp.*-Equisetum arvense* (Farjon and Bogaers 1985), *Salix alaxensis-Chamerion latifolium* subtype *Parnassia kotzebui* (Schickhoff et al. 2002) and *Salix alaxensis* (Boggs et al. 1999) associations.
Distribution: Found on small and large active or inactive floodplains on the Coastal Plain, Brooks Range Foothills, and in the Brooks Range. Also common on ephemeral streams in the Brooks Range Foothills and Brooks Range. Common.
Patch size: Small to large patch. Typically linear on streams.
Elevation: 25 to 488 m and higher
Slope: 0 to 10°
Landform: Active and inactive floodplains and small active streams.
Hydrology: The sites are relatively dry except during flooding. Mesic on some oxbows and overflow channels.
Soil: The soil surface is either bare alluvium or a thin organic mat—up to 3 cm thick—over silt, sand and

rocks. Permafrost not reached at 40 cm deep. Water table typically > 40 cm. The pH ranges from 6.7 to 7.7.

Landcover class: Low-tall willow

Vegetation: *Salix alaxensis* is the dominant species in the low to tall shrub layer, typically < 0.5 m tall but sometimes ranging up to 3 m. Its cover varies from 15 to 95%. The understory species composition is highly variable. Some shrubs may have high cover including *Salix phlebophylla*, and *Salix reticulata*. Herbaceous cover is often sparse, but in more mesic sites, such as river oxbows, herbaceous cover may be high including *Anemone parviflora, Equisetum arvense, Eurybia sibirica, Hedysarum boreale* ssp. *mackenziei, Calamagrostis canadensis* and *Poa arctica.* Bareground, rock and litter often have high cover. Moss cover ranges from 0 to 50% and lichen cover is sparse.

The following tabulation lists the species that occur in this association with > 1 % cover, and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	1	6
Salix alaxensis	47	100
Salix glauca	1	6
Salix hastata	1	12
Salix phlebophylla	1	6
Salix pulchra	1	12
Salix reticulata	4	24
Salix richardsonii	1	12
Forb		
Aconitum delphiniifolium	1	6
Artemisia tilesii	1	18
Artemisia tilesii ssp. *elatior*	1	12
Chamerion angustifolium	1	6
Equisetum arvense	9	41
Equisetum scirpoides	1	12
Equisetum variegatum	1	24
Eurybia sibirica	2	53
Hedysarum alpinum	1	18
Hedysarum boreale ssp. *mackenziei*	1	6
Graminoid		
Arctagrostis latifolia	1	12
Bromus inermis	1	24
Calamagrostis canadensis	1	6
Carex aquatilis	1	12
Carex membranacea	1	12
Leymus innovatus	1	6
Poa arctica	1	12
Lichen		
Cladina	1	6
Moss		
Campylium	1	6
Dicranum elongatum	3	6
Ditrichum	2	6
Drepanocladus	2	12
Moss	7	35
Oncophorus wahlenbergii	3	6
Sanionia uncinata	1	6

***Salix alaxensis/Dryas octopetala* Plant Association**
Feltleaf willow/Eightpetal mountain-avens Plant Association

Plots sampled: 5
Rank: G5; S5

Salix alaxensis/*Dryas octopetala* Plant Association in the Delong Mountains on the Lisburne Peninsula.

Other studies: Not previously described.
Distribution: Found on small active floodplains and ephemeral streams in the Brooks Range Foothills and Brooks Range. Common.
Patch size: Small patch. Typically linear on streams.
Elevation: 115 to 850 m and higher
Slope: 1 to 13°
Landform: Small active streams
Hydrology: The sites are relatively dry except during flooding.
Soil: The soil surface is either bare rock or a thin dry to mesic organic horizon—up to 2 cm thick—over silt, sand and rocks. Some A horizon development. Permafrost not reached at 40 cm deep. Water table typically > 40 cm. The pH ranges from 6.9 to 7.5.
Landcover class: Low-tall willow
Seral stage: These are more stable sites than the *Salix alaxensis* association.
Vegetation: *Salix alaxensis* dominates the low to tall shrub layer, typically < 0.5 m tall but sometimes ranging up to 2 m. Its cover varies from 20 to 30%. The combined *Dryas octopetala* and *Dryas integrifolia* cover ranges from 15 to 30%. Other common shrubs include *Cassiope tetragona, Salix reticulata,* and *Vaccinium uliginosum.* Herbaceous cover is often sparse and species with high fidelity include *Chamerion latifolium, Arctagrostis latifolia,* and *Carex scirpoidea.* Bareground, rock and litter often have high cover. Moss cover ranges from 6 to 50% and *Hylocomium splendens* may be common. Lichen cover is sparse.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	2	40
Arctous rubra	1	20
Cassiope tetragona	2	60
Dryas integrifolia	4	20
Dryas octopetala	17	100
Empetrum nigrum	0	20
Ledum groenlandicum	0	20
Rhododendron lapponicum	0	20
Salix alaxensis	28	100
Salix arctica	0	20
Salix phlebophylla	0	20
Salix polaris	0	20
Salix pulchra	0	20
Salix reticulata	9	100
Salix richardsonii	4	20
Shepherdia canadensis	0	20
Vaccinium uliginosum	4	60
Forb		
Androsace chamaejasme	0	40
Anemone drummondii	0	20
Anemone narcissiflora	0	20
Anemone parviflora	0	40
Antennaria friesiana	0	20
Artemisia glomerata	0	20
Aster	0	20
Astragalus alpinus	0	20
Astragalus umbellatus	0	20
Boykinia richardsonii	0	20
Chamerion angustifolium	0	20
Chamerion latifolium	1	60
Dodecatheon	0	20
Equisetum arvense	1	20
Equisetum scirpoides	0	20
Equisetum variegatum	0	20
Hedysarum	0	20
Hedysarum alpinum	0	20
Minuartia	0	20
Oxytropis nigrescens	0	40
Oxytropis scammaniana	0	20
Parnassia palustris	0	20
Parrya nudicaulis	0	20
Pedicularis capitata	0	20
Pedicularis langsdorffii	0	40
Potentilla biflora	0	40
Saxifraga hirculus	0	20
Saxifraga oppositifolia	0	20
Silene acaulis	0	20
Tephroseris atropurpurea	0	20
Thalictrum alpinum	0	40
Tofieldia coccinea	0	40
Zigadenus elegans	0	20
Graminoid		
Anthoxanthum monticola	0	20
Arctagrostis latifolia	0	60
Calamagrostis purpurascens	0	20
Carex krausei	0	20
Carex membranacea	0	20
Carex scirpoidea	2	60
Festuca altaica	0	20
Juncus castaneus	0	20
Luzula arctica ssp. *latifolia*	0	20
Luzula groenlandica	0	20
Luzula multiflora	0	20
Poa alpina	0	20
Poa arctica	0	40
Trisetum spicatum	0	20
Lichen		
Cetraria islandica	1	20
Dactylina arctica	0	20
Flavocetraria cucullata	0	20
Lobaria linita	0	20
Thamnolia vermicularis	0	20
Moss		
Hylocomium splendens	14	60
Moss	2	40
Rhytidium rugosum	1	20
Tomentypnum nitens	1	20

***Salix arbusculoides* Plant Association**
Littletree willow Plant Association

Plots sampled: 3
Rank: GNR; SNR

Salix arbusculoides Plant Association on the coastal plain near the Sagavanirktok River.

Other studies: Similar to *Salix arbusculoides-S. glauca-S. hastata-Betula glandulosa/Bromus pumpellianus-Festuca altaica* (Batten 1977).
Distribution: Occurs on small and large active floodplains on the Coastal Plain, and Brooks Range Foothills. Uncommon.
Patch size: Small to large
Slope: 0 to 1°
Landform: Active floodplains
Hydrology: Mesic
Soil: The soil surface is typically litter or a thin layer of organic horizon—up to 5 cm thick—over silt, sand and rocks. Older stable sites have an A and B horizon. Permafrost not reached at 40 cm deep. Water table typically > 40 cm. The pH ranges from 6.4 to 6.8.
Landcover class: Low-tall willow
Vegetation: This is an early to mid-seral floodplain association and consequently the species composition is highly variable. *Salix arbusculoides* has > 10% cover and often the dominant willow species. Co-dominant willows include *Salix glauca, Salix hastata, Salix richardsonii,* and *Salix pseudomonticola.* Willow height ranges up to 3 m. The understory species composition is also highly variable and may include *Equisetum variegatum, Lupinus arcticus, Carex aquatilis* and *Poa arctica*. Moss cover may be high and dominated by *Tomentypnum nitens,* and lichen cover is sparse.

***Salix glauca* Plant Association**
Grayleaf willow Plant Association

Plots sampled: 7
Rank: G3; S3

Salix glauca Plant Association on dunes near Barrow.

Other studies: This is a highly variable association that may be subdivided after further sampling. Similar to *Salix glauca/Dryas octopetala* (Webber et al. 1978) and other studies.
Distribution: Occurs on river dunes, active floodplains and unstable sandy slopes bordering lakes. Uncommon, but relatively common on the sandsheet region of the Coastal Plain.
Patch size: Small to large
Elevation: 1 to 831 m
Slope: 0 to 60°
Landform: River dunes, active floodplains and unstable sandy slopes bordering lakes
Hydrology: Dry to mesic
Soil: Sandy C horizons often over buried organic horizons. No permafrost at 1 m. pH ranges from 7.2 to 7.7
Landcover class: Low-tall willow
Seral stage: Early seral
Vegetation: These are early-seral sites with highly variable species composition. *Salix glauca* dominates, its cover ranges from 15% to 95%, and height from 0.2 to 2 m. On active dunes, the understory cover is typically sparse and may include *Equisetum arvense, Poa glauca*, and *Astragalus alpinus*. Moss and lichens are generally absent and exposed sandy soil is common.

On stabilized sites, vascular cover may be high under the *Salix glauca* and include *Dryas octopetala, Rhododendron lapponicum, Arctous rubra,* and *Equisetum arvense*. Non-vascular cover may also be high and include *Aulacomnium acuminatum, Ditrichum flexicaule* and *Philonotis fontana*.

Several rare species such as *Koeleria asiatica, Poa hartzii, Poa subulata, Rumex graminifolius* and *Mertensia drummondii* occur regularly on inland dune sites.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	0	14
Arctous rubra	6	57
Betula nana	0	14
Dryas integrifolia	1	43
Dryas octopetala	7	14
Empetrum nigrum	0	14
Rhododendron lapponicum	4	14
Salix alaxensis	0	29
Salix glauca	37	86
Salix glauca ssp. *stipulifera*	4	14
Salix reticulata	1	29
Salix richardsonii	1	29
Vaccinium uliginosum	0	14
Forb		
Androsace chamaejasme	0	14
Anemone	0	14
Armeria maritima ssp. *sibirica*	0	14
Artemisia tilesii	0	43
Artemisia tilesii ssp. *elatior*	0	14
Astragalus alpinus	1	71
Cnidium cnidiifolium	0	29
Corallorhiza trifida	0	14
Draba cinerea	0	29
Equisetum arvense	5	71
Equisetum scirpoides	3	14
Equisetum variegatum	0	14
Eurybia sibirica	0	29
Hedysarum alpinum	0	29
Lagotis minor	0	14
Oxytropis campestris var. *jordalii*	1	14
Packera hyperborealis	0	14
Parnassia palustris	0	14
Pedicularis	0	29
Pedicularis langsdorffii	0	14
Pinguicula vulgaris	0	14
Polemonium boreale ssp. *boreale*	0	14
Polygonum viviparum	0	14
Pyrola grandiflora	0	14
Senecio lugens	0	14
Silene involucrata ssp. *elatior*	0	14
Stellaria longipes	0	29
Tanacetum bipinnatum-bipinnatum	0	29
Graminoid		
Bromus inermis-pumpellianus	1	43
Calamagrostis purpurascens	0	14
Carex aquatilis	2	29
Carex capillaris	0	14
Carex krausei	0	14
Carex maritima	0	14
Carex ursina	0	14
Elymus alaskanus-alaskanus	0	14
Eriophorum vaginatum	0	14
Festuca altaica	0	14
Festuca brachyphylla	0	14
Festuca rubra	0	29
Festuca rubra ssp. *arctica*	0	14
Juncus arcticus ssp. *alaskanus*	0	14
Koeleria asiatica	0	29
Leymus mollis	1	43
Luzula confusa	0	14
Poa	0	14
Poa glauca	0	43
Poa pratensis ssp. *alpigena*	0	14
Poa sublanata	0	14
Lichen		
Cladonia	0	14
Lichen species, crustose	1	29
Peltigera aphthosa	0	14
Stereocaulon	0	14
Moss		
Aulacomnium	0	14
Aulacomnium acuminatum	7	14
Ditrichum flexicaule	7	14
Moss	1	14
Philonotis fontana	3	14

***Salix glauca-Vaccinium uliginosum* Plant Association**
Grayleaf willow-Bog blueberry Plant Association

Plots sampled: 2
Rank: GNR; SNR

Salix glauca-Vaccinium uliginosum Plant Association on a sideslope near Galbraith Lake, Brooks Range, Alaska.

Other studies: Similar to *Salix glauca-Arctous rubra-Vaccinium uliginosum-Arctagrostis latifolia* (Hettinger and Janz 1974) and other studies.
Distribution: In the Brooks Range. Uncommon.
Environment: Small patch on mesic mountain side-slopes
Landcover class: Low-Tall Willow
Vegetation: *Salix glauca* co-dominates the overstory with *Vaccinium uliginosum* and/or *Betula nana*. *Salix glauca* height ranges up to 0.7 m. Other common species may include *Dryas octopetala*, *Anthoxanthum monticola* ssp. *alpinum*, *Carex lugens* and *Poa arctica*.

Species	Cov %	Con %
Shrub		
Betula nana	15	50
Dryas octopetala	3	100
Salix glauca	40	100
Salix phlebophylla	1	50
Salix reticulata	1	50
Vaccinium uliginosum	15	50
Forb		
Aconitum delphiniifolium ssp. *delphiniifolium*	2	100
Artemisia arctica ssp. *arctica*	1	50
Astragalus alpinus	0	50
Astragalus umbellatus	0	50
Bupleurum americanum	0	50
Chamerion angustifolium	0	50
Gentianella propinqua ssp. *aleutica*	0	50
Hedysarum alpinum	1	50
Minuartia macrocarpa	0	50
Papaver	0	50
Petasites frigidus var. *frigidus*	0	50
Polemonium	0	50
Polygonum viviparum	0	50
Potentilla furcata	2	50
Potentilla nivea	0	50
Saussurea angustifolia	0	50
Saxifraga nelsoniana	0	50
Saxifraga reflexa	0	50
Senecio lugens	1	50
Smelowskia calycina var. *porsildii*	0	50
Stellaria longifolia	0	50
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	5	50
Arctagrostis latifolia	0	50
Calamagrostis purpurascens	1	50
Carex lugens	10	50
Luzula kjellmaniana	0	50
Poa arctica	3	100
Poa glauca	3	50
Trichophorum cespitosum	1	50
Lichen		
Flavocetraria nivalis	1	50
Sarcographa tricosa	0	50
Stereocaulon	1	50
Thamnolia vermicularis	1	50
Moss		
Abietinella abietina	10	50
Moss	15	50
Rhytidium rugosum	0	0

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

***Salix niphoclada/Salix reticulata* Plant Association**
Barrenground willow/Netleaf willow Plant Association

Plots sampled: 2
Rank: GNR; SNR

Salix niphoclada/Salix reticulata Plant Association on an active floodplain of the Sagavanirktok River.

Other studies: Not previously described.
Rank: G5; S5
Distribution: Occurs on active and inactive floodplains and on steep unstable slopes on the Coastal Plain, Brooks Range Foothills, and in the Brooks Range. Uncommon.
Patch size: Small to large
Elevation: Low to high elevations
Slope: 0 to 25°
Landform: Active and inactive floodplains and unstable alpine slopes
Hydrology: The sites are relatively dry except during flooding.
Soil: Includes floodplain alluvial soils and unstable colluvial side-slopes (Viereck and Little 2007).
Landcover class: Low-tall willow
Vegetation: *Salix niphoclada* dominates or co-dominates with *Salix hastata*. Shrub height is typically < 1 m tall. Common understory species include *Arctous rubra, Salix reticulata, Vaccinium uliginosum, Equisetum arvense,* and *Hylocomium splendens.* Bareground, rock and litter may have high cover.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctous rubra	10	50
Betula nana	1	50
Cassiope tetragona	2	50
Dryas octopetala	1	50
Salix alaxensis	0	50
Salix hastata	10	50
Salix niphoclada	30	100
Salix reticulata	12	100
Vaccinium uliginosum	4	100
Forb		
Anemone narcissiflora	1	50
Anemone parviflora	1	50
Astragalus alpinus	1	50
Chamerion latifolium	1	50
Equisetum arvense	10	50
Equisetum scirpoides	0	50
Gentianella propinqua	1	50
Hedysarum alpinum	1	50
Parnassia palustris	0	50
Polemonium boreale	1	50
Polygonum viviparum	0	50
Pyrola minor	5	50
Saxifraga tricuspidata	1	50
Graminoid	2	100
Anthoxanthum monticola ssp. *alpinum*	1	50
Festuca altaica	1	50
Moss		
Abietinella abietina	0	50
Homalothecium	5	50
Hylocomium splendens	15	100
Tomentypnum nitens	0	50

***Salix pulchra-Carex aquatilis* Plant Association**
Tealeaf willow-Water sedge Plant Association

Plots sampled: 8
Rank: G5; S5

Salix pulchra-Carex aquatilis Plant Association on a river bluff south of Wainwright, Alaska.

Other studies: Similar to the *Salix planifolia-Carex aquatilis* (Komarkova and Webber 1978), *Salix pulchra-Valeriana capitata* (Walker et al. 1994, Schickhoff et al. 2002) and *Salix planifolia* ssp. *pulchra/Carex aquatilis* (Boggs et al. 1999) associations. Same as the *Salix pulchra-Carex aquatilis* association (MacKenzie et al. 2014 [in prep]).
Distribution: Common on water tracts, level ground and high-center and flat-top polygons in the Brooks Range, Brooks Range Foothills and Coastal Plain.
Patch size: Small to large
Elevation: 3 to 924 m
Slope: 0 to 5°
Landform: Water tracks, better drained bluff edges, high-center and flat-top polygons.
Hydrology: Wet
Soil: Variable, often with a thin organic horizon over an A or C horizon. Others are a thick (36 cm) organic horizon over mineral soil. pH ranges from 4.7 to 6.4. Permafrost occurs in all sites.
Landcover class: Low-tall willow
Vegetation: *Salix pulchra* typically dominates and its height ranges from 15 to 60 cm. *Carex aquatilis* cover ranges up to 60%, and *Sphagnum* cover ranges up to 50%. Other common species include *Betula nana, Arctagrostis latifolia, Eriophorum vaginatum*, and *Pedicularis langsdorffii*. Lichens are generally sparse and exposed mineral soil rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %)

Species	Cov %	Con %
Shrub		
Betula nana	5	63
Empetrum nigrum	0	13
Rhododendron tomentosum	1	25
Rhododendron lapponicum	0	13
Salix alaxensis	3	13
Salix arctica	0	13
Salix fuscescens	1	13
Salix pseudomonticola	3	13
Salix pulchra	47	100
Salix reticulata	6	38
Vaccinium uliginosum	2	25
Vaccinium vitis-idaea	1	25
Forb		
Caltha palustris	0	13
Cardamine bellidifolia	0	13
Cardamine microphylla	0	13
Chrysosplenium tetrandrum	0	13
Comarum palustre	1	38
Equisetum arvense	3	25
Equisetum scirpoides	1	13
Eutrema edwardsii	0	25
Pedicularis	0	25
Pedicularis langsdorffii	0	38
Petasites frigidus	2	38
Petasites frigidus var. *frigidus*	0	13
Polemonium acutiflorum	0	25
Polygonum bistorta	0	13
Polygonum viviparum	0	25
Pyrola grandiflora	0	25
Rubus chamaemorus	3	13
Saxifraga cernua	0	13
Saxifraga hieraciifolia	0	25
Saxifraga hirculus	0	13
Saxifraga nelsoniana	0	38
Saxifraga nelsoniana ssp. *nelsoniana*	0	13
Stellaria longifolia var. *longifolia*	0	13
Stellaria longipes	0	25
Stellaria longipes ssp. *longipes*	0	13
Graminoid		
Alopecurus alpinus	0	13
Arctagrostis latifolia	2	38
Calamagrostis canadensis	3	13
Calamagrostis stricta ssp. *inexpansa*	1	25
Calamagrostis stricta ssp. *stricta*	1	13
Carex albonigra	2	13
Carex aquatilis	36	88
Carex lugens	1	25
Eriophorum angustifolium	3	25
Eriophorum russeolum	0	13
Eriophorum vaginatum	4	50
Luzula kjellmaniana	0	13
Poa arctica	1	38
Poa pratensis ssp. *alpigena*	1	13
Lichen		
Cladina rangiferina	0	13
Cladonia gracilis	0	25
Dactylina arctica	0	25
Flavocetraria cucullata	0	13
Peltigera aphthosa	0	13
Peltigera leucophlebia	0	13
Moss		
Aulacomnium	5	25
Aulacomnium palustre	3	13
Aulacomnium turgidum	2	38
Ceratodon purpureus	0	13
Dicranum spadiceum	3	13
Hylocomium splendens	4	25
Moss	13	38
Polytrichum hyperboreum	3	25
Polytrichum juniperinum	0	13
Sphagnum	19	75
Sphagnum arcticum	0	13
Sphagnum contortum	0	13
Sphagnum squarrosum	1	13
Sphagnum warnstorfii	1	13
Timmia austriaca	1	13

***Salix pulchra/Hylocomium splendens* Plant Association**
Tealeaf willow/Splendid feather moss Plant Association

Plots sampled: 7
Rank: G5; S5

Salix pulchra/Hylocomium splendens Plant Association near Cape Lisburne, Alaska.

Other studies: Similar to the *Salix pulchra-Valeriana capitata* (Walker et al. 1994, Schickhoffet al. 2002), *Salix planifolia* ssp. *pulchra* (closed) and *Salix planifolia* ssp. *pulchra* (open) (Boggs et al. 1999) associations.
Distribution: Common on stream banks, moist slopes and bordering water tracts in the Brooks Range, Brooks Range Foothills and Coastal Plain. Also occurs on high-center polygons.
Patch size: Small to large patch, often linear
Elevation: 23 to 787 m
Slope: 0 to 10°
Landform: Better drained bluff edges, stream banks, water tracks, active and inactive floodplains, slopes and high-center polygons.
Hydrology: Mesic to occasionally wet
Soil: Variable, often with a thin organic horizon over an A or C horizon. Others are a thick (25 cm) organic horizon over mineral soil. pH ranges from 4.5 to 7.5. Permafrost likely occurs in all sites.
Landcover class: Low-tall willow
Vegetation: *Salix pulchra* dominates often with high cover. Total willow cover ranges from 25 to 95%, and the height ranges from 5 to 45 cm. *Betula nana* is common in some stands. Forb and graminoid cover is typically low. Moss cover ranges up to 90% and commonly dominated by *Hylocomium splendens*. Lichens are generally sparse and exposed mineral soil rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	0	29
Betula nana	2	43
Cassiope tetragona	1	29
Dasiphora fruticosa	0	14
Dryas integrifolia	1	29
Dryas octopetala	2	29
Empetrum nigrum	0	29
Rhododendron tomentosum	1	29
Rhododendron lapponicum	0	14
Salix alaxensis	1	14
Salix arctica	0	14
Salix glauca	3	14
Salix phlebophylla	0	14
Salix pulchra	52	100
Salix reticulata	5	29
Shepherdia canadensis	0	14
Vaccinium uliginosum	0	29
Vaccinium vitis-idaea	1	14
Vaccinium vitis-idaea ssp. *minus*	0	14
Forb		
Aconitum delphiniifolium	0	14
Anemone richardsonii	0	14
Artemisia arctica	1	29
Artemisia glomerata	0	14
Chamerion angustifolium	0	14
Chamerion latifolium	0	29
Dodecatheon frigidum	0	14
Equisetum arvense	4	57
Geum glaciale	0	14
Hedysarum alpinum	0	14
Lagotis glauca	0	14
Oxytropis nigrescens ssp. *bryophila*	0	14
Papaver radicatum	0	14
Parnassia kotzebuei	0	14
Pedicularis capitata	0	14
Pedicularis langsdorffii	0	29
Petasites frigidus	4	71
Polemonium acutiflorum	0	43
Polygonum bistorta	0	43
Pyrola asarifolia	0	29
Rubus chamaemorus	2	29
Saxifraga calycina	0	14
Saxifraga hieraciifolia	0	14
Saxifraga nelsoniana	0	14
Silene acaulis	0	14
Stellaria	0	14
Tephroseris atropurpurea ssp. *frigida*	0	14
Tephroseris lindstroemii	0	14
Valeriana capitata	0	43
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	0	29
Arctagrostis latifolia	0	14
Bromus inermis ssp. *pumpellianus*	0	14
Calamagrostis	1	14
Calamagrostis canadensis	0	14
Calamagrostis lapponica	0	14
Calamagrostis purpurascens	0	14
Calamagrostis stricta	0	14
Calamagrostis stricta ssp. *inexpansa*	0	14
Carex aquatilis	0	29
Carex digitalisCarex digitalis	0	14
Carex lugens	2	29
Carex microchaeta	0	14
Carex obtusata	0	14
Carex vaginata	0	14
Eriophorum vaginatum	0	14
Festuca altaica	1	29
Luzula	0	14
Luzula arctica ssp. *latifolia*	0	14
Luzula confusa	0	14
Poa arctica	3	29
Scirpus	0	14
Lichen		
Cetraria	0	14
Cladonia chlorophaea	1	14
Dactylina arctica	0	14
Masonhalea richardsonii	0	29
Moss		
Aulacomnium turgidum	1	29
Dicranum	10	14
Hylocomium splendens	36	86
Moss	3	29
Pohlia nutans	1	14
Polytrichum	0	14
Sphagnum	1	14

***Salix pulchra-Eriophorum angustifolium* Plant Association**
Tealeaf willow-Tall cottongrass Plant Association

Plots sampled: 6
Rank: G5; S5

Salix pulchra-Eriophorum angustifolium Plant Association on flat-top polygonal ground near Utqiaġvik, Alaska.

Other studies: Similar to the *Salix planifolia-Betula nana-Vaccinium vitis-idaea-Vaccinium uliginosum-Eriophorum angustifolium-E. vaginatum-Carex bigelowii-Petasites frigidus/Sphagnum* spp.*-Hylocomium splendens-Aulacomnium palustre-Dicranum* spp.*-Peltigera* spp. (Jorgenson et al. 1994), and *Salix pulchra-Eriophorum angustifolium-Sphagnum* (MacKenzie et al. 2014 [in prep]) associations.
Distribution: Common on water tracks and flat-top and low-center polygons in the Brooks Range Foothills and Coastal Plain.
Patch size: Small to large
Elevation: 4 to 796 m
Slope: 0 to 8°
Landform: Water tracks and flat-top and low-center polygons.
Hydrology: Wet
Soil: Variable, often with a thin organic horizon over an A or C horizon. Others are a thick (27 cm) organic horizon or root mat over mineral soil. pH ranges from 4.3 to 6.3. Permafrost occurs in all sites.
Landcover class: Low-tall willow
Vegetation: *Salix pulchra* typically dominates and its height ranges from 10 to 60 cm. *Eriophorum angustifolium* cover ranges from 20 to 30%. Other common species include *Betula nana*, *Carex aquatilis*, *Carex lugens*, and *Eriophorum vaginatum.* Moss cover may be high (80%) and common dominants include *Aulacomnium* spp. and *Sphagnum* spp. Lichens are generally sparse and exposed mineral soil rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	4	50
Dryas integrifolia	0	33
Salix fuscescens	2	17
Salix phlebophylla	3	17
Salix polaris	1	17
Salix pulchra	45	100
Salix reticulata	2	33
Salix rotundifolia	0	17
Vaccinium vitis-idaea	1	17
Forb		
Anemone	0	17
Cardamine pratensis	0	17
Equisetum arvense	0	33
Pedicularis sudetica ssp. *albolabiata*	0	17
Petasites frigidus	0	33
Petasites frigidus var. *frigidus*	0	17
Polygonum bistorta	0	17
Polygonum viviparum	0	17
Pyrola	0	17
Ranunculus nivalis	0	17
Rubus chamaemorus	1	17
Saxifraga cernua	0	17
Saxifraga hirculus	0	17
Saxifraga nelsoniana	0	17
Saxifraga nelsoniana ssp. *nelsoniana*	0	17
Stellaria longipes	1	17
Tephroseris atropurpurea ssp. *frigida*	0	17
Graminoid		
Arctagrostis latifolia	0	17
Arctagrostis latifolia ssp. *latifolia*	0	17
Calamagrostis	0	17
Carex aquatilis	6	67
Carex lugens	7	67
Eriophorum angustifolium	27	100
Eriophorum russeolum	1	17
Eriophorum vaginatum	4	50
Luzula confusa	0	17
Poa arctica ssp. *arctica*	2	17
Poa pratensis ssp. *alpigena*	0	17
Lichen		
Cladonia	0	17
Peltigera	0	33
Liverwort	3	17
Ptilidium ciliare	3	17
Moss		
Aulacomnium	8	50
Aulacomnium acuminatum	1	17
Aulacomnium palustre	5	17
Dicranum groenlandicum	2	17
Hylocomium splendens	5	17
Moss	1	17
Polytrichum	1	17
Polytrichum juniperinum	2	17
Sphagnum	20	67
Sphagnum fimbriatum	2	17

***Salix richardsonii/Arctous rubra-Salix reticulata* Plant Association (provisional)**
Richardson's willow/Red fruit bearberry-Netleaf willow Plant Association (provisional)

Plots sampled: 9
Rank: G5; S5

Salix richardsonii/Arctous rubra-Salix reticulata Plant Association (provisional) on water track in foothills above the Dalton Highway, Brooks Range, Alaska.

Other studies: Similar to the *Salix lanata/Equisetum arvense* (Webber et al. 1978), *Salix richardsonii-Anemone parviflora* subtype *Salix richardsonii* (Walker 1985), *Salix lanata-S. glauca-S. reticulata-Arctous rubra-Equisetum variegatum-Astragalus umbellatus-Oxytropis maydelliana/Tomenthypnum nitens-Hylocomium splendens-Campylium stellatum-Hypnum* spp.*-Dicranum* spp. (Jorgenson et al. 1994), and *Salix lanata* ssp. *richardsonii* (Boggs et al. 1999) Plant Associations.
Distribution: Common on active and inactive floodplains, stream banks, and bordering water tracks in the Brooks Range, Brooks Range Foothills and Coastal Plain. Also occurs on active dunes.
Patch size: Small to large patch, often linear
Elevation: 301 to 778 m
Slope: 1 to 20°
Landform: Active and inactive floodplains, stream banks, bordering water tracks and on dunes
Hydrology: Dry, mesic to occasionally wet
Soil: Variable, often with a thin organic horizon over an A or C horizon. Sandy C horizons sometimes over buried organic horizons. pH ranges from 7.4 to 7.5. No permafrost at 40 cm depth.
Landcover class: Low-tall willow
Vegetation: *Salix richardsonii* dominates or co-dominates with *Salix arbusculoides* or *Salix glauca.* Willow height ranges from 0.8 to 2 m. Understory cover is highly variable and includes *Salix reticulata, Arctous rubra, Equisetum arvense,* and *Festuca rubra.* Moss cover ranges up to 40%, lichens are generally absent and exposed mineral soil common on dunes and floodplains.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctous rubra	10	63
Betula nana	1	13
Cassiope tetragona	0	13
Dasiphora fruticosa ssp. *floribunda*	0	13
Dryas integrifolia	0	38
Dryas octopetala	1	25
Empetrum nigrum	3	13
Salix alaxensis	1	38
Salix arbusculoides	1	13
Salix glauca	8	25
Salix niphoclada	1	13
Salix pulchra	0	13
Salix reticulata	9	75
Salix richardsonii	47	100
Shepherdia canadensis	0	13
Vaccinium uliginosum	2	38
Vaccinium vitis-idaea	0	13
Forb		
Aconitum delphiniifolium	0	13
Anemone parviflora	0	25
Anemone richardsonii	1	25
Artemisia tilesii	0	13
Astragalus umbellatus	0	13
Bupleurum americanum	0	13
Dodecatheon frigidum	0	25
Equisetum arvense	9	38
Equisetum variegatum	4	38
Eurybia sibirica	0	13
Gentianella propinqua	0	13
Hedysarum alpinum	3	50
Lupinus arcticus	1	38
Parnassia palustris	0	13
Pedicularis lanata	0	13
Pedicularis langsdorffii	0	13
Pedicularis verticillata	0	25
Petasites frigidus	0	25
Petasites frigidus var. *frigidus*	0	13
Petasites frigidus var. *sagittatus*	0	13
Polygonum bistorta	0	13
Polygonum viviparum	0	25
Potamogeton friesii	0	13
Pyrola asarifolia	0	25
Saussurea angustifolia	0	13
Saxifraga hirculus	0	13
Senecio lugens	0	13
Solidago multiradiata	0	25
Tofieldia coccinea	0	13
Valeriana capitata	0	13
Zigadenus elegans	0	13
Graminoid		
Arctagrostis latifolia	0	25
Bromus inermis ssp. *pumpellianus*	1	38
Calamagrostis purpurascens	1	13
Carex krausei	0	13
Carex lugens	3	13
Carex membranacea	3	13
Carex scirpoidea	0	13
Festuca altaica	0	13
Festuca rubra ssp. *arctica*	3	13
Poa	0	13
Moss		
Brachythecium albicans	1	25
Hylocomium splendens	5	25
Moss	4	25
Rhytidiadelphus loreus	3	13
Sanionia uncinata	4	13

Salix richardsonii/Arctous rubra-Salix reticulata Plant Association (provisional) on an active floodplain of Sagavanirktok River.

***Salix richardsonii/Carex membranacea* Plant Association (provisional)**
Richardson willow/Fragile sedge Plant Association

Plots sampled: 1
Rank: GNR; SNR

Salix richardsonii/Carex membranacea Plant Association (provisional) on flatland on the Coastal Plain near the Dalton Highway, Alaska.

Other studies: Same as the *Salix lanata* ssp. *richardsonii/Carex membranacea* Plant Association (Boggs et al. 1999).
Distribution: Coastal plain and Brooks Range Foothills. Uncommon.
Environment: These are wet, level to low angle sites. The soils have a shallow to thick (0.3 m) organic horizon. The one pH measured is 7.5.
Landcover class: Low-tall willow
Vegetation: *Salix richardsonii* dominates the shrub layer ranging up to 1 m in height, and *Carex membranacea* dominates the herbaceous layer with > 25% cover. Associate species include *Salix reticulata*, *Dryas integrifolia*, *Vaccinium uliginosum* and *Carex capillaris.* Moss and lichen cover are sparse.

***Salix richardsonii/Eriophorum angustifolium* Plant Association**
Richardson's willow/Tall cottongrass Plant Association

Plots sampled: 2
Rank: GNR; SNR

Salix richardsonii/Eriophorum angustifolium Plant Association on flatland on the Coastal Plain near the Dalton Highway, Alaska.

Other studies: Similar to *Salix richardsonii-Carex aquatilis* (MacKenzie et al. 2014 [in prep]) association.
Distribution: Uncommon, but widely distributed on flat-top polygons and terraces near dunes on the Coastal Plain.
Patch size: Small to large
Elevation: 14 to 129 m
Slope: 0°
Landform: Flat-top polygons and terraces near dunes.
Hydrology: Wet
Soil: Variable, often with a thin organic horizon over an A or C horizon. Others are a thick (44 cm) organic horizon over mineral soil. pH ranges from 6.6 to 6.9. Permafrost likely occurs in all sites.
Landcover class: Low-tall willow
Vegetation: *Salix richardsonii* dominates and its height ranges up to 0.5 m. *Eriophorum angustifolium* cover ranges from 30 to 60%. Other common species may include *Dryas integrifolia, Carex aquatilis,* and *Eriophorum vaginatum.* Moss and lichen cover are sparse and exposed mineral soil rare.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctous rubra	1	50
Dryas integrifolia	5	50
Salix arctica	1	50
Salix fuscescens	1	50
Salix ovalifolia	0	50
Salix reticulata	1	50
Salix richardsonii	28	100
Forb		
Cardamine digitata	0	50
Pedicularis	0	50
Pedicularis sudetica ssp. *albolabiata*	1	50
Polygonum bistorta	0	50
Polygonum viviparum	0	50
Thalictrum alpinum	0	50
Tofieldia pusilla	0	50
Graminoid		
Arctagrostis latifolia	0	50
Carex aquatilis	20	50
Carex lugens	1	50
Carex saxatilis	3	50
Carex scirpoidea	0	50
Dupontia fisheri	1	50
Eriophorum angustifolium	45	100
Eriophorum vaginatum	5	50
Juncus triglumis	0	50
Lichen		
Flavocetraria cucullata	0	50
Moss		
Moss	5	50

Birch Ericaceous Low Shrub Plant Associations

***Betula nana/Cladina rangiferina* Plant Association**
Shrub birch/Reindeer lichen Plant Association

Plots sampled: 2
Rank: G5; S5
Other studies: Similar to the *Betula glandulosa/Festuca altaica-Vaccinium* spp./feather mosses-lichen (Hanson 1951), Lichen-*Betula glandulosa* (Boggs et al. 1999), and *Betula nana-Cladina stellaris* (MacKenzie et al. 2014 [in prep]) associations.
Distribution: Uncommon on hill slopes and ridges on the north side of the Brooks Range. Relatively common in the mountains on the south side of the Brooks Range (Boggs et al. 1999).
Patch size: Small
Elevation: 460 to 1,508 m
Slope: 5° to 30° and steeper
Landform: Side-slopes and ridges in mountains and alluvial fans.
Hydrology: Mesic
Soil: The soils are sand and sand mixed with cobble, and a thin organic horizon may occur. The pH varies from 4.7 to 5.0 (Boggs et al. 1999).
Landcover class: Birch Ericaceous Low Shrub, or Dwarf Shrub-other
Vegetation: *Betula nana* dominates or co-dominates with *Rhododendron tomentosum.* Lichen cover is > 25% and dominated by *Cladina rangiferina. Betula nana* height ranges from 0.1 to 1 m. Moss cover is low.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctous rubra	1	50
Betula nana	60	100
Cassiope tetragona	1	50
Rhododendron tomentosum	11	100
Loiseleuria procumbens	3	50
Vaccinium uliginosum	1	50
Vaccinium vitis-idaea	0	50
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	0	50
Carex podocarpa	0	50
Lichen		
Cetraria	5	50
Cladina rangiferina	80	100
Moss		
Hylocomium splendens	0	50

***Betula nana/Rhododendron tomentosum* Plant Association**
Shrub birch/Marsh Labrador tea Plant Association

Plots sampled: 8
Rank: G5; S5

Betula nana/Rhododendron tomentosum Plant Association in the Brooks Range Foothills near Ivotuk Creek, Alaska.

Other studies: Similar to the *Betula glandulosa* (Hanson 1953), *Betula nana-Salix pulchra* (Walker et al. 1994), *Betula nana-Ledum palustre-Rubus chamaemorus* and *Betula nana-Vaccinium uliginosum-V. vitis-idaea* (MacKenzie et al. 2014 [in prep]) associations and numerous other studies.
Distribution: Common on ancient floodplain terraces, upper stream banks, and mesic side-slopes in the Brooks Range, Brooks Range Foothills and Coastal Plain. Also occurs on high-center polygons.
Patch size: Small to large
Elevation: 77 to 816 m
Slope: 0° to 25° and steeper
Landform: Better drained bluff edges, stream banks, ancient floodplains terraces, slopes, rounded mountain ridges, and occasionally on high-center polygons.
Hydrology: Mesic
Soil: Variable, often with a thin organic horizon over an A or C horizon. Others are a thick (25 cm) organic horizon over mineral soil. pH ranges from 4.1 to 5.9. Permafrost likely occurs in all sites.
Landcover class: Birch Ericaceous Low Shrub, or Dwarf Shrub-other
Vegetation: *Betula nana* dominates or co-dominates with *Rhododendron tomentosum. Betula nana* height ranges from 10 to 45 cm. Other common shrubs include *Dryas octopetala, Salix pulchra, Vaccinium vitis-idaea* and *Vaccinium uliginosum.* Wet inclusions may include *Eriophorum angustifolium*. Moss cover may be high and commonly dominated by *Aulacomnium* spp., *Hylocomium splendens, Polytrichum hyperboreum* and *Sphagnum* spp. Lichen cover is < 25% and commonly includes *Cladina* spp. and *Flavocetraria* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	0	13
Arctous rubra	0	13
Betula nana	58	100
Cassiope tetragona	0	13
Dasiphora fruticosa	0	13
Dryas integrifolia	1	13
Dryas octopetala	5	38
Empetrum nigrum	4	38
Rhododendron tomentosum	8	88
Loiseleuria procumbens	0	25
Salix fuscescens	0	13
Salix glauca	1	38
Salix phlebophylla	0	13
Salix pulchra	3	75
Vaccinium oxycoccos	0	25
Vaccinium uliginosum	3	75
Vaccinium vitis-idaea	4	63
Forb		
Anemone narcissiflora	0	13
Bupleurum americanum	0	13
Campanula lasiocarpa	0	13
Lupinus arcticus	1	13
Oxytropis maydelliana	0	13
Pedicularis labradorica	0	13
Petasites frigidus var. *frigidus*	0	13
Polygonum bistorta	0	25
Polygonum viviparum	0	13
Pyrola asarifolia	0	13
Pyrola secunda	0	13
Rubus chamaemorus	1	13
Saussurea angustifolia	0	13
Saxifraga	0	13
Stellaria longipes	0	13
Graminoid		
Anthoxanthum monticola-alpinum	1	38
Bromus	0	13
Calamagrostis purpurascens	0	13
Carex aquatilis	1	13
Carex interior	0	13
Carex lugens	3	13
Carex rotundata	0	13
Carex scirpoidea	1	13
Elymus alaskanus ssp. *alaskanus*	0	13
Eriophorum angustifolium	1	50
Eriophorum vaginatum	1	25
Festuca altaica	0	13
Luzula confusa	0	13
Poa arctica	0	25
Lichen		
Cladina rangiferina	1	50
Cladonia gracilis	0	13
Dactylina arctica	0	13
Flavocetraria cucullata	1	38
Flavocetraria nivalis	1	13
Lichen	3	38
Masonhalea richardsonii	0	13
Nephroma arcticum	0	13
Peltigera	1	38
Pertusaria	1	13
Sphaerophorus globosus	0	13
Stereocaulon	0	13
Thamnolia vermicularis	1	25
Liverwort		
Ptilidium ciliare	3	13
Moss		
Aulacomnium turgidum	8	25
Dicranum acutifolium	1	13
Dicranum elongatum	0	13
Hylocomium splendens	8	38
Hypnum plicatulum	1	13
Moss	13	38
Pleurozium schreberi	1	13
Polytrichum commune	0	13
Polytrichum hyperboreum	8	13
Rhytidium rugosum	3	13
Sanionia uncinata	1	13
Sphagnum	7	25
Sphagnum magellanicum	1	13
Sphagnum warnstorfii	0	13

***Rhododendron tomentosum/Vaccinium vitis-idaea* Plant Association**
Marsh Labrador tea/Mountain cranberry Plant Association

Plots sampled: 2
Rank: GNR; SNR


Rhododendron tomentosum/Vaccinium vitis-idaea on high-center polygon near Wainwright, Alaska.

Other studies: Similar to the *Ledum decumbens-Vaccinium vitis-idaea-Cetraria* spp. (Hanson 1951) and *Ledum decumbens-Rubus chamaemorus* (Walker et al. 1994) associations.
Distribution: Coastal plain. Uncommon.
Environment: Occurs on high-center polygons, typically on the coastline. The soil has a thin organic horizon (2 cm). Sites are mesic and permafrost occurs. Decadent tussocks typically occur indicating these sites were once wetter, supporting tussock tundra on polygonal ground. The soil surface has a white lumpy appearance due to moss polsters of *Dicranum elongatum* covered by the white lichen *Ochrolechia* spp. (Webber 1978).
Landcover class: Birch Ericaceous Low Shrub, or Dwarf Shrub-other
Vegetation: *Rhododendron tomentosum* dominates or co-dominates the shrub layer.
Other common shrubs include *Cassiope tetragona, Salix phlebophylla, Salix pulchra* and *Vaccinium vitis-idaea*. Common herbaceous species may include *Rubus chamaemorus, Eriophorum vaginatum* and *Luzula confusa.* Crustose lichen cover is typically high. Moss cover is low to moderate and include *Aulacomnium palustre, Dicranum elongatum,* and *Polytrichum* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Cassiope tetragona	5	50
Rhododendron tomentosum	20	100
Salix phlebophylla	3	50
Salix pulchra	8	100
Salix rotundifolia	1	50
Vaccinium vitis-idaea	15	100
Forb		
Petasites frigidus	2	50
Rubus chamaemorus	5	50
Graminoid		
Calamagrostis lapponica	5	50
Carex aquatilis	5	50
Carex microchaeta	3	50
Eriophorum vaginatum	8	100
Luzula confusa	7	100
Lichen		
Bryocaulon divergens	1	50
Cladonia fimbriata	1	50
Cladonia gracilis	3	50
Flavocetraria cucullata	1	50
Lichen, crustose	35	100
Teloschistes	1	50
Thamnolia vermicularis	0	50
Moss		
Aulacomnium palustre	1	50
Dicranum	2	50
Dicranum elongatum	10	50
Dicranum groenlandicum	0	50
Polytrichum	2	100
Sphagnum fimbriatum	0	50

***Vaccinium uliginosum/Dryas octopetala* Plant Association**
Bog blueberry/Eightpetal mountain-avens Plant Association

Plots sampled: 2
Rank: G5; S5

Vaccinium uliginosum/Dryas octopetala Plant Association on a sideslope in the central Brooks Range, Alaska.

Other studies: Similar to the *Vaccinium uliginosum-V. vitis-idaea* (Hettinger and Janz 1974), and *Vaccinium uliginosum/*Fruticose lichen (Boggs et al. 1999) associations.
Distribution: This is an uncommon association on side-slopes and ridges in the Brooks Range.
Environment: This association occurs on stable and unstable side-slopes and ridges in the mountains. Patch size is small to large. The soils are a thin layer of organic horizon sometimes over an A horizon. The pH on one site is 6.4. Permafrost likely occurs.
Landcover class: Birch Ericaceous Low Shrub, or Dwarf Shrub-other
Vegetation: Exposed rock and mineral soil are common on the unstable side-slopes. *Vaccinium uliginosum* dominates. Common sub-dominants include *Dryas octopetala, Cassiope tetragona, Diapensia lapponica* and *Vaccinium vitis-idaea.* Total herbaceous cover is < 40% and include *Anthoxanthum monticola* ssp. *alpinum, Carex misandra, Antennaria friesiana, Pedicularis capitata, Bistorta officinalis,* and *Silene acaulis.* Moss cover may be moderate on more stable sites and include *Dicranum* spp., and *Racomitrium lanuginosum.* Lichen cover may also be moderate and include *Alectoria* spp., *Cladina* spp., *Flavocetraria* spp., and *Thamnolia vermicularis.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	2	50
Cassiope tetragona	10	100
Diapensia lapponica	5	50
Dryas octopetala	25	100
Empetrum nigrum	1	50
Rhododendron tomentosum	2	50
Salix phlebophylla	3	100
Salix reticulata	1	50
Vaccinium uliginosum	45	100
Vaccinium vitis-idaea	3	100
Forb		
Antennaria friesiana	0	50
Oxytropis nigrescens	0	50
Pedicularis capitata	0	50
Pedicularis lanata	0	50
Polemonium	0	50
Polygonum bistorta	0	50
Silene acaulis	0	50
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	3	50
Carex lugens	1	50
Carex misandra	3	50
Lichen		
Alectoria	3	50
Asahinea chrysantha	3	50
Cladina rangiferina	5	50
Flavocetraria cucullata	5	50
Flavocetraria nivalis	3	50
Lichen	3	50
Lichen, crustose	5	50
Masonhalea richardsonii	3	50
Sphaerophorus globosus	3	50
Thamnolia vermicularis	3	50
Moss		
Dicranum	10	50
Racomitrium lanuginosum	3	50

Tussock Tundra Plant Associations

***Carex lugens/Salix reticulata* Plant Association**
Spruce muskeg sedge/Netleaf willow Plant Association

Plots sampled: 4
Rank: G5; S5

Carex lugens/Salix reticulata Plant Association in the Brooks Range Foothills near the Dalton Highway, Alaska.

Other studies: Similar to *Carex bigelowii-Dryas integrifolia* subtype *Carex membranacea* (Walker et al. 1994), *Carex bigelowii* (Boggs et al. 1999), *Dryas integrifolia-Carex lugens* (MacKenzie et al 2014) Plant Associations and numerous other studies.
Distribution: Widely distributed but uncommon on the Coastal Plain, Brooks Range Foothills, valley bottoms of the Brooks Range and on ancient river terraces.
Patch size: Small
Elevation: Near sea-level to 849 m and higher
Slope: 0 to 6°
Landform: It occurs on high-centered and flat-topped polygons, foothill slopes and valley bottoms.
Hydrology: The soils are wet, and sometimes surface water occurs between tussocks.
Soil: Sites are cold, poorly drained and underlain by wet, silty to sandy mineral soils typically with a surface organic horizon surrounding the tussocks (Viereck et al. 1992). Permafrost and water table depths are shallow. The one pH recorded is 6.7.
Landcover class: Tussock Tundra
Vegetation: *Carex lugens* is the primary tussock-former, but *Eriophorum vaginatum* may be common.

Total shrub cover is < 25% and includes *Betula nana, Dryas integrifolia, Rhododendron tomentosum, Salix reticulata, Vaccinium vitis-idaea* and *Vaccinium uliginosum*. Forbs are uncommon and may include *Petasites frigidus* and *Pyrola secunda.* Common nonvascular species include *Aulacomnium palustre, Dicranum elongatum* and *Hylocomium splendens*. On high-centered polygons, the high-center is dominated by the plants given above and the troughs are typically dominated by *Carex aquatilis, Eriophorum angustifolium* or *Eriophorum chamissonis*.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	0	25
Betula nana	2	75
Cassiope tetragona	0	25
Dryas integrifolia	2	50
Dryas octopetala	1	75
Rhododendron tomentosum	1	75
Rhododendron lapponicum	1	50
Salix arctica	0	25
Salix niphoclada	0	25
Salix phlebophylla	2	50
Salix pulchra	2	75
Salix reticulata	9	100
Salix richardsonii	1	25
Vaccinium uliginosum	3	75
Vaccinium vitis-idaea	1	25
Forb		
Arnica lessingii	0	25
Eutrema edwardsii	0	25
Pedicularis capitata	0	25
Pedicularis lanata	0	25
Pedicularis langsdorffii	0	25
Pedicularis verticillata	0	25
Petasites frigidus var. *frigidus*	0	25
Polemonium acutiflorum	0	25
Polygonum bistorta	1	75
Polygonum viviparum	0	25
Pyrola asarifolia	0	25
Pyrola secunda	0	25
Saussurea angustifolia	0	25
Saxifraga nelsoniana ssp. *nelsoniana*	0	50
Stellaria longipes	0	25
Graminoid		
Anthoxanthum monticola	0	25
Arctagrostis latifolia	0	25
Carex aquatilis	0	25
Carex lugens	54	100
Eriophorum angustifolium	1	25
Eriophorum vaginatum	8	75
Luzula arctica ssp. *latifolia*	0	25
Lichen		
Cladina rangiferina	0	25
Dactylina arctica	0	50
Flavocetraria cucullata	0	50
Flavocetraria nivalis	0	25
Masonhalea richardsonii	0	50
Peltigera	0	25
Sphaerophorus globosus	0	25
Stereocaulon	0	25
Teloschistes	0	25
Thamnolia vermicularis	0	25
Moss		
Aulacomnium	3	25
Aulacomnium palustre	8	25
Dicranum	1	25
Dicranum elongatum	8	25
Hylocomium splendens	28	50
Moss	5	50
Rhytidium rugosum	1	25
Sphagnum	1	25

***Eriophorum vaginatum/Rhododendron tomentosum* Plant Association**
Tussock cottongrass/Marsh Labrador tea Plant Association

Plots sampled: 5
Rank: G5; S5

Eriophorum vaginatum/Rhododendron tomentosum Plant Association in the Brooks Range Foothills near the Dalton Highway, Alaska.

Other studies: Similar to the *Eriophorum vaginatum/Carex bigelowii/Ledum decumbens/Vaccinium vitis-idaea* (Hanson 1950), *Eriophorum vaginatum-Sphagnum* spp. subtype *Eriophorum vaginatum* (Walker et al. 1994), *Eriophorum vaginatum-Sphagnum* spp. subtype *Sphagnum compactum* (Komarkova and Webber 1980), several Jorgenson et al. (1994), *Eriophorum vaginatum* (Boggs et al. 1999), *Eriophorum vaginatum-Sphagnum* (MacKenzie et al 2014) associations and numerous other studies.
Distribution: Widely distributed but uncommon on the Coastal Plain, Brooks Range Foothills, valley bottoms of the Brooks Range and on ancient river terraces.
Patch size: Small
Elevation: 3 to 545 m and higher
Slope: 0 to 10°
Landform: It occurs on high-centered and flat-topped polygons, foothill slopes and valley bottoms.
Hydrology: The soils are wet, and sometimes surface water occurs between tussocks.
Soil: Sites are cold, poorly drained and underlain by wet, silty to sandy mineral soils typically with a surface organic horizon surrounding the tussocks (Viereck et al. 1992). Permafrost depth ranges from 15 to 20 cm. Water table ranges from 0 to 20 cm. The pH ranges from 5.2 to 6.4.
Landcover class: Tussock Tundra
Vegetation: *Eriophorum vaginatum* is the primary tussock-former, but *Carex lugens* may be common. Total shrub cover is < 25% and common shrubs include *Cassiope tetragona*, *Rhododendron tomentosum*, *Vaccinium vitis-idaea* and *Vaccinium uliginosum*. Forbs are uncommon. Common nonvascular species include *Aulacomnium* spp., *Dicranum* spp., and *Polytrichum* spp.

On high-centered polygons, the high-center is dominated by the plants given above and the troughs are typically dominated by *Carex aquatilis*, *Eriophorum angustifolium* or *Eriophorum chamissonis.*

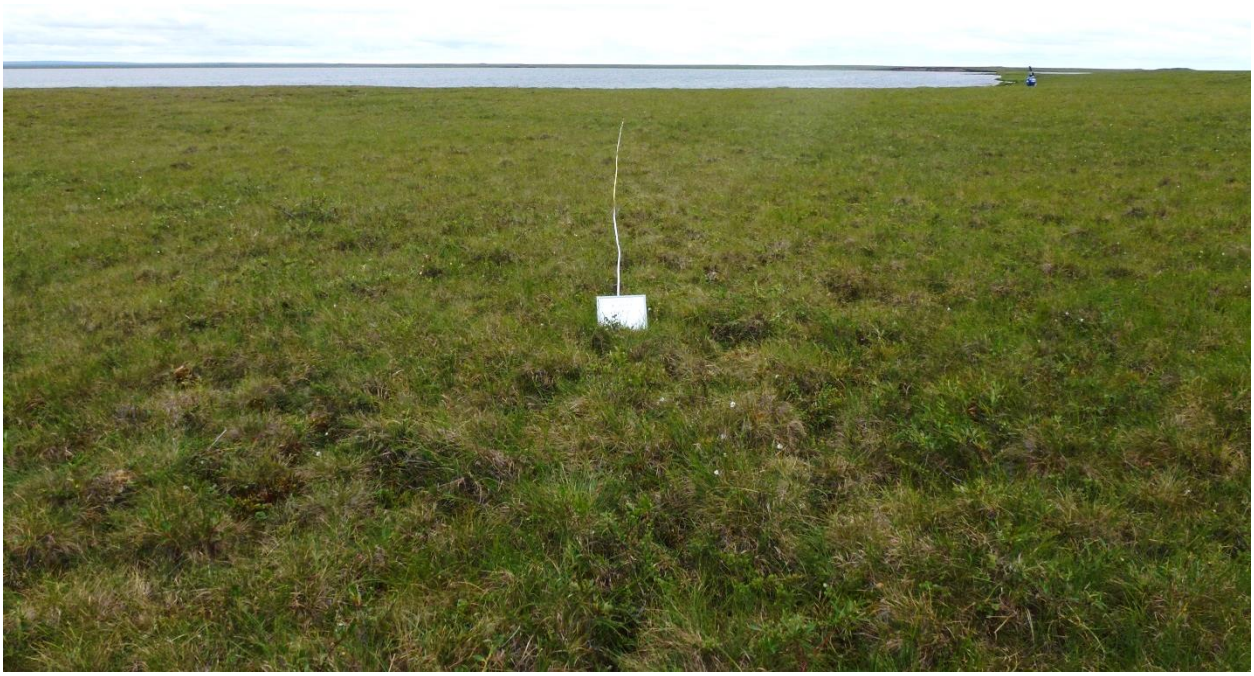
The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	1	20
Betula nana	1	40
Cassiope tetragona	1	60
Dryas octopetala	1	20
Empetrum nigrum	0	20
Rhododendron tomentosum	4	80
Salix arctica	1	20
Salix ovalifolia	0	20
Salix polaris	0	20
Salix pulchra	1	20
Salix reticulata	1	20
Vaccinium uliginosum	4	20
Vaccinium vitis-idaea	7	60
Forb		
Equisetum arvense	0	20
Pedicularis	0	20
Pedicularis langsdorffii	0	20
Petasites frigidus	0	20
Polygonum bistorta	0	20
Rubus chamaemorus	1	20
Saxifraga	0	20
Saxifraga hieraciifolia	0	20
Graminoid		
Arctagrostis latifolia ssp. *latifolia*	0	20
Carex aquatilis	4	40
Carex aquatilis var. stans	2	20
Carex lugens	2	20
Eriophorum angustifolium	0	20
Eriophorum vaginatum	57	100
Luzula confusa	5	40
Poa glauca	1	20
Lichen		
Alectoria	0	20
Alectoria ochroleuca	1	20
Bryocaulon	0	20
Bryoria	0	20
Cetraria	0	20
Cladina rangiferina	3	20
Cladonia	0	20
Dactylina arctica	1	40
Flavocetraria cucullata	1	20
Flavocetraria nivalis	2	20
Lichen	0	20
Lichen, crustose	1	20
Peltigera	0	20
Thamnolia vermicularis	0	40
Moss		
Aulacomnium	1	20
Aulacomnium turgidum	4	20
Dicranum elongatum	4	20
Dicranum groenlandicum	4	20
Moss	2	20
Polytrichum	3	40
Sphagnum	2	20

Tussock Shrub Tundra Plant Associations

***Betula nana-Carex lugens* Plant Association**
Shrub birch-Spruce muskeg sedge Plant Association

Plots sampled: 4
Rank: G5; S5



Betula nana-Carex lugens Plant Association in the National Petroleum Reserve-Alaska on the Coastal Plain.

Other studies: Similar to *Betula glandulosa-Vaccinium* spp.-*Carex bigelowii* (Hanson 1950) association, several Jorgenson et al. (1994) associations, the *Betula nana/Carex bigelowii* , and *Vaccinium uliginosum-Ledum palustre/Carex bigelowii* (Boggs et al. 1999) associations and the *Betula nana-Ledum palustre-Carex lugens* (MacKenzie et al 2014) association.
Distribution: Common on the Coastal Plain, Brooks Range Foothills, valley bottoms of the Brooks Range and on ancient river terraces.
Patch size: Small to large
Elevation: 0 to 570 m and higher
Slope: 0 to 5°
Landform: Occurs on high-centered and flat-topped polygons, foothill slopes and valley bottoms.
Hydrology: The soils are wet, and sometimes surface water occurs between tussocks.
Soil: Sites are cold, poorly drained and underlain by wet, silty to sandy mineral soils with a shallow to thick (23 cm) surface organic horizon surrounding the tussocks (Viereck et al. 1992). Permafrost depth ranges from 25 to 30 cm. Water table ranges from 23 to 30 cm. The pH ranges from 4.2 to 4.8.
Landcover class: Tussock Shrub Tundra
Vegetation: Total combined cover of *Betula nana, Rhododendron tomentosum* and *Vaccinium uliginosum* is > 25%. *Carex lugens* is the primary tussock-former, but *Eriophorum vaginatum* may be common. Other common shrubs include *Empetrum nigrum* and *Vaccinium vitis-idaea*. Forbs are uncommon although *Equisetum arvense* may have high cover. Common nonvascular species include

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	3	50
Betula nana	35	75
Cassiope tetragona	5	50
Dryas octopetala	1	25
Empetrum nigrum	6	50
Rhododendron tomentosum	9	100
Rhododendron lapponicum	0	25
Salix phlebophylla	1	25
Salix pulchra	2	75
Vaccinium uliginosum	11	75
Vaccinium vitis-idaea	16	75
Forb		
Equisetum arvense	16	50
Pedicularis lapponica	0	25
Petasites frigidus	0	25
Polygonum	0	25
Polygonum bistorta	0	50
Rubus chamaemorus	0	25
Saussurea angustifolia	0	25
Tephroseris atropurpurea ssp. *frigida*	0	25
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	0	50
Calamagrostis	0	25
Carex	3	25
Carex aquatilis	3	25
Carex lugens	33	100
Carex vaginata	1	25
Eriophorum vaginatum	5	25
Trichophorum cespitosum	3	25
Lichen		
Cladina	1	50
Cladonia	6	25
Lichen	1	25
Lichen, crustose	1	25
Stereocaulon	0	25
Liverwort		
Pleuroclada albescens	1	25
Ptilidium sp.	1	25
Moss		
Dicranum	1	25
Hylocomium splendens	2	75
Moss	11	75
Racomitrium lanuginosum	1	25
Sphagnum	2	75

Sphagnum spp., and *Hylocomium splendens.* On high-centered polygons, the high-center is dominated by the plants given above and the troughs are typically dominated by *Carex aquatilis, Eriophorum angustifolium* or *Eriophorum chamissonis.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

***Betula nana-Eriophorum vaginatum* Plant Association**
Shrub birch-Tussock cottongrass Plant Association

Plots sampled: 8
Rank: G5; S5

Betula nana-Eriophorum vaginatum Plant Association in the Brooks Range Foothills near the Dalton Highway, Alaska.

Other studies: Similar to the *Eriophorum vaginatum-Betula nana-Ledum decumbens-Vaccinium* spp.-*Carex bigelowii* (Hopkins and Sigafoos 1951), *Eriophorum vaginatum-Sphagnum* spp. subtypes *Betula nana* and *Salix pulchra* (Walker et al. 1994), several Jorgenson et al. (1994), *Betula nana-Vaccinium vitis-idaea-Eriophorum vaginatum* (MacKenzie et al 2014), *Vaccinium uliginosum-Ledum palustre/Eriophorum vaginatum* (Boggs et al. 1999) associations.
Distribution: Common on the Coastal Plain, Brooks Range Foothills, valley bottoms of the Brooks Range and on ancient river terraces.
Patch size: Small to large
Elevation: 3 to 526 m and higher
Slope: 0 to 10°
Landform: It occurs on high-centered and flat-topped polygons, foothill slopes and valley bottoms.
Hydrology: The soils are wet, and sometimes surface water occurs between tussocks.
Soil: Sites are cold, poorly drained and underlain by wet, silty to sandy mineral soils with a shallow to thick (18 cm) surface organic horizon surrounding the tussocks (Viereck et al. 1992). Some soils have A horizon development. Permafrost depth ranges from 20 to 32 cm. Water table ranges from 0 to 32 cm. The pH ranges from 4.3 to 6.0.

Landcover class: Tussock Shrub Tundra
Vegetation: Total combined cover of *Betula nana*, *Rhododendron tomentosum* and *Vaccinium uliginosum* is > 25%. *Eriophorum vaginatum* is the primary tussock-former, but *Carex lugens* may co-dominate. *Vaccinium vitis-idaea* is also common. Forbs are uncommon and include *Rubus chamaemorus.* Common nonvascular species include *Aulocomnium* spp., *Hylocomium splendens* and *Sphagnum* spp. On high-centered polygons, the high-center is dominated by the plants given above and the troughs are typically dominated by *Carex aquatilis, Eriophorum angustifolium* or *Eriophorum chamissonis.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	1	25
Betula nana	15	100
Cassiope tetragona	0	13
Empetrum nigrum	2	38
Rhododendron tomentosum	15	100
Salix pulchra	3	75
Salix richardsonii	0	13
Vaccinium oxycoccos	1	13
Vaccinium uliginosum	7	50
Vaccinium vitis-idaea	11	100
Forb		
Pedicularis	0	38
Pedicularis labradorica	0	13
Petasites frigidus	0	13
Polygonum bistorta	0	13
Rubus chamaemorus	5	50
Saussurea angustifolia	0	13
Sparganium angustifolium	0	13
Graminoid		
Arctagrostis latifolia	0	13
Carex	1	13
Carex lugens	6	63
Eriophorum vaginatum	51	100
Juncus biglumis	0	13
Lichen		
Alectoria ochroleuca	0	13
Cladina	0	13
Cladina mitis	0	13
Cladina rangiferina	1	50
Cladonia	0	38
Cladonia uncialis	1	13
Dactylina arctica	0	75
Flavocetraria cucullata	2	88
Lichen, crustose	1	13
Masonhalea richardsonii	0	13
Melanelia culbersonii	0	13
Nephroma arcticum	0	13
Peltigera	0	38
Sphaerophorus globosus	0	25
Stereocaulon	0	25
Thamnolia vermicularis	0	50
Liverwort		
Pleuroclada albescens	0	13
Ptilidium ciliare	1	13
Ptilidium sp.	1	13
Moss		
Aulacomnium	1	13
Aulacomnium turgidum	9	75
Dicranum	3	13
Dicranum elongatum	1	13
Dicranum groenlandicum	1	13
Dicranum spadiceum	1	13
Hylocomium splendens	13	75
Pohlia nutans	1	13
Polytrichum	0	13
Polytrichum hyperboreum	0	13
Racomitrium lanuginosum	1	13
Rhytidium rugosum	3	13
Sphagnum	13	50
Sphagnum angustifolium	8	13
Sphagnum rubellum	6	25
Sphagnum warnstorfii	7	38

***Salix pulchra-Eriophorum vaginatum* Plant Association**
Tealeaf willow-Spruce muskeg sedge Plant Association

Plots sampled: 8
Rank: G5; S5

Salix pulchra-Eriophorum vaginatum Plant Association shrub tussock tundra in the central Brooks Range Foothills, Alaska.

Other studies: Similar to the *Eriophorum vaginatum-Betula nana-Salix planifolia-Ledum decumbens-Vaccinium* spp. (Koranda 1960), several Jorgenson et al. (1994), *Eriophorum vaginatum-Sphagnum* spp. subtypes *Betula nana* and *Salix pulchra* (Walker et al. 1994), *Salix planifolia* ssp. *pulchra/Carex bigelowii* (Boggs et al. 1999), and *Salix pulchra-Eriophorum vaginatum* (MacKenzie et al 2014) associations.
Distribution: Common on the Coastal Plain, Brooks Range Foothills, valley bottoms of the Brooks Range and on ancient river terraces.
Patch size: Small to large
Elevation: 3 to 894 m and higher
Slope: 0 to 10°
Landform: It occurs on high-centered and flat-topped polygons, foothill slopes and valley bottoms.
Hydrology: The soils are wet, and sometimes surface water occurs between tussocks.
Soil: Sites are cold, poorly drained and underlain by wet, silty to sandy mineral soils with a shallow to thick (40 cm) surface organic horizon surrounding the tussocks (Viereck et al. 1992). Permafrost depth ranges from 15 to 45 cm. Water table ranges from 0 to 45 cm. The pH ranges from 5.3 to 6.3.
Landcover class: Tussock Shrub Tundra
Vegetation: *Salix pulchra* dominates or co-dominates the sites with *Betula nana, Rhododendron tomentosum, Vaccinium vitis-idaea* and *Vaccinium uliginosum*. *Eriophorum vaginatum* and *Carex lugens* are the dominant graminoids. Forbs are uncommon. Common moss species include *Aulacomnium turgidum, Dicranum elongatum, Hylocomium splendens* and *Sphagnum* spp.

On high-centered polygons, the high-center is dominated by the plants given above and the troughs are typically dominated by *Carex aquatilis, Eriophorum angustifolium* or *Eriophorum chamissonis.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	0	25
Betula nana	6	63
Cassiope tetragona	0	38
Dryas integrifolia	0	25
Dryas octopetala	0	13
Empetrum nigrum	0	25
Rhododendron tomentosum	3	63
Salix arctica	0	13
Salix glauca	0	13
Salix phlebophylla	2	38
Salix pulchra	23	100
Salix reticulata	2	25
Salix richardsonii	1	13
Vaccinium uliginosum	2	38
Vaccinium vitis-idaea	2	63
Forb		
Anemone narcissiflora	0	13
Arnica	0	13
Arnica lessingii	0	13
Astragalus umbellatus	0	13
Campanula lasiocarpa	0	13
Chrysosplenium tetrandrum	0	13
Pedicularis capitata	0	13
Pedicularis labradorica	0	25
Pedicularis lanata	0	13
Pedicularis langsdorffii	0	25
Pedicularis lapponica	0	13
Petasites frigidus	0	63
Petasites frigidus var. *sagittatus*	0	13
Polemonium acutiflorum	0	13
Polygonum bistorta	0	50
Pyrola	0	25
Pyrola asarifolia	0	13
Rubus chamaemorus	0	25
Saussurea angustifolia	0	13
Saxifraga cernua	0	13
Saxifraga hieraciifolia	0	13
Saxifraga nelsoniana	0	25
Saxifraga nelsoniana ssp. *nelsoniana*	0	13
Valeriana capitata	0	25
Graminoid		
Anthoxanthum monticola	1	25
Arctagrostis latifolia	0	13
Calamagrostis stricta	1	13
Carex lugens	23	100
Eriophorum angustifolium	0	13
Eriophorum russeolum	10	25
Eriophorum vaginatum	23	63
Juncus biglumis	0	13
Luzula confusa	0	13
Luzula kjellmaniana	0	13
Poa arctica	1	25
Lichen		
Cladina rangiferina	0	13
Cladonia uncialis	3	13
Dactylina arctica	0	38
Flavocetraria cucullata	0	25
Flavocetraria nivalis	0	13
Masonhalea richardsonii	0	25
Nephroma arcticum	0	13
Peltigera	0	25
Thamnolia vermicularis	0	38
Liverwort		
Blepharostoma trichophyllum	0	13
Pleuroclada albescens	0	13
Moss		
Aulacomnium palustre	1	13
Aulacomnium turgidum	4	38
Dicranum elongatum	6	13
Hylocomium splendens	3	50
Moss	9	38
Polytrichum	1	13
Polytrichum hyperboreum	4	13
Sphagnum	10	75
Sphagnum russowii	0	13
Sphagnum teres	4	13
Sphagnum warnstorfii	0	13
Tomentypnum nitens	0	13

Mesic Sedge/Dwarf Shrub Tundra Plant Associations

***Carex aquatilis/Vaccinium vitis-idaea* Plant Association**
Water sedge/Mountain cranberry Plant Association

Plots sampled: 4
Rank: GNR; SNR

Carex aquatilis/Vaccinium vitis-idaea Plant Association on slope near Cape Lisburne, Alaska.

Other studies: Similar to the *Carex aquatilis-Dryas integrifolia* (Webber and Walker 1975, Walker 1985, Elias et al. 1996), *Carex aquatilis-Saxifraga cernua* (Webber 1978), and *Betula glandulosa/Carex aquatilis* (Boggs et al. 1999) associations.
Distribution: Coastal plain. Uncommon.
Environment: Occurs on flat-top or high-center polygons, typically on the coastline. The soil has a thin organic horizon (5 cm) over a sandy substrate. Sites are mesic and permafrost occurs. Decadent tussocks typically occur indicating these sites were once wetter, supporting tussock tundra on polygonal ground. The soil surface may have a white lumpy appearance due to moss polsters of *Dicranum elongatum* covered by the white lichen *Ochrolechia* spp. (Webber 1978).
Landcover class: Mesic Sedge-Dwarf Shrub Tundra
Vegetation: *Carex aquatilis* dominates, and dwarf shrub cover is > 25%. Common herbaceous species may include *Eriophorum angustifolium, Eriophorum vaginatum,* and *Poa arctica*. Common shrubs include *Betula nana, Salix arctica, Salix pulchra* and *Vaccinium vitis-idaea*. Lichen cover is often high including *Alectoria ochroleuca, Bryocaulon divergens, Cetraria islandica* ssp. *islandica, Cladina arbuscula, Cladonia* spp. and crustose lichen. Moss cover may also be high and include *Aulacomnium*

palustre, Dicranum elongatum, Dicranum groenlandicum, Hylocomium splendens, Polytrichum spp. and *Sphagnum* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	9	75
Cassiope tetragona	3	50
Empetrum nigrum	0	25
Rhododendron tomentosum	4	75
Salix arctica	10	25
Salix fuscescens	4	25
Salix ovalifolia	0	25
Salix phlebophylla	1	25
Salix pulchra	10	75
Vaccinium uliginosum	0	25
Vaccinium vitis-idaea	8	100
Forb		
Pedicularis lanata	0	25
Pedicularis langsdorffii	0	25
Petasites frigidus	2	75
Polemonium acutiflorum	0	25
Polygonum bistorta	0	25
Rubus chamaemorus	1	75
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	4	50
Calamagrostis stricta ssp. *inexpansa*	0	25
Carex aquatilis	43	100
Carex lugens	1	25
Eriophorum angustifolium	18	25
Eriophorum vaginatum	9	75
Luzula confusa	0	50
Poa arctica	4	50
Lichen		
Alectoria ochroleuca	1	25
Bryocaulon divergens	1	25
Cetraria islandica	3	25
Cladina	1	25
Cladina arbuscula	1	25
Cladonia	0	50
Cladonia ecmocyna	1	25
Dactylina arctica	1	25
Flavocetraria nivalis	1	25
Lichen	2	50
Lichen, crustose	0	25
Sphaerophorus globosus	1	25
Thamnolia vermicularis	1	25
Moss		
Aulacomnium	5	25
Aulacomnium palustre	1	25
Dicranum elongatum	5	25
Dicranum groenlandicum	6	50
Hylocomium splendens	3	25
Moss	3	25
Oncophorus wahlenbergii	1	25
Polytrichum	3	25
Sphagnum	8	50
Sphagnum fimbriatum	1	25

***Carex lugens/Dryas octopetala* Plant Association**
Spruce muskeg sedge/Eightpetal mountain-avens Plant Association

Plots sampled: 3
Rank: G5; S5

Carex lugens/Dryas octopetala Plant Association on lower slopes in Brooks Range above the Atigun River, Alaska.

Other studies: Similar to the *Carex bigelowii-Dryas octopetala* (Johnson et al. 1966), *Dryas octopetala/Carex* spp. (Boggs et al. 1999) associations, several Jorgenson et al. (1994) associations, and several other studies.
Distribution: This is an uncommon association located on slopes throughout the Brooks Range and Brooks Range Foothills.
Patch size: Small to large
Elevation: 155 to 1,061 m
Slope: 4 to 11°
Landform: This association occurs on stable wet side-slopes underlain by permafrost.
Hydrology: Primarily wet, but some sites are mesic.
Soil: The soil surface topography is typically hummocky. Soils are a thin organic horizon over A/B horizon or C horizon, often mixed with rock. The pH ranges from 4.8 to 6.8. Permafrost likely occurs in all sites.
Landcover class: Mesic Sedge-Dwarf Shrub Tundra
Vegetation: Hummocks (but not tussocks) are common and water occurs between the hummocks. Total herbaceous cover is > 25%, and dominated by *Carex lugens*, *Carex aquatilis* or *Eriophorum angustifolium*. For shrubs, *Dryas octopetala* has > 10% cover and typically co-dominant with *Salix*

reticulata, Salix arctica, and/or *Salix fuscescens.* Moss cover may be high and include *Catoscopium nigritum, Hylocomium splendens,* and *Tomentypnum nitens.* Lichen cover is typically below 10%, and exposed rock and mineral soil are uncommon. The hummocks support species that prefer more mesic sites (i.e. *Dryas octopetala* and *Hylocomium splendens*) and the wet depressions support species that prefer wet conditions such as *Carex aquatilis*.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Diapensia lapponica	0	33
Dryas octopetala	30	100
Salix arctica	7	33
Salix fuscescens	5	33
Salix phlebophylla	2	33
Salix pulchra	0	33
Salix reticulata	13	67
Salix rotundifolia	0	33
Salix stolonifera	0	33
Forb		
Anemone richardsonii	0	33
Astragalus alpinus	0	33
Cerastium beeringianum	0	33
Equisetum arvense	2	33
Equisetum palustre	0	33
Equisetum scirpoides	1	33
Equisetum variegatum	1	67
Oxytropis nigrescens	0	33
Pedicularis	0	67
Polygonum viviparum	1	67
Ranunculus pallasii	0	33
Graminoid		
Anthoxanthum monticola-alpinum	0	33
Arctagrostis latifolia	2	33
Carex aquatilis	17	33
Carex atrofusca	3	33
Carex lugens	45	100
Carex misandra	2	33
Eriophorum angustifolium	3	67
Eriophorum callitrix	3	33
Eriophorum vaginatum	2	33
Juncus	2	33
Juncus biglumis	0	33
Poa	2	33
Lichen		
Cladina	0	33
Lichen, crustose	0	33
Peltigera	0	33
Moss		
Catoscopium nigritum	15	33
Drepanocladus	5	33
Hylocomium splendens	2	33
Moss	7	33
Tomentypnum nitens	37	67

***Carex lugens/Vaccinium vitis-idaea* Plant Association (provisional)**
Spruce muskeg sedge/Mountain cranberry Plant Association

Plots sampled: 3
Rank: G5; S5

Carex lugens/Vaccinium vitis-idaea Plant Association (provisional) valley bottom in Brooks Range above the Atigun River, Alaska.

Other studies: Similar to the *Carex bigelowii-Dryas octopetala* (Johnson et al. 1966) association, several Jorgenson et al. (1994) associations, and several other studies.
Distribution: This is a common association located on slopes throughout the Brooks Range and Brooks Range Foothills.
Patch size: Small to large
Elevation: 751 to 815 m and higher
Slope: 9 to 12°
Landform: This association is common on stable wet side-slopes underlain by permafrost.
Hydrology: Wet to mesic.
Soil: Soils are an 8 to 15 cm organic horizon over A/B horizon or C horizon, often mixed with rock. The pH ranges from 6.8 to 7.5 suggesting that the sites are on calcareous substrates. Permafrost likely occurs in all sites.
Landcover class: Mesic Sedge-Dwarf Shrub Tundra
Vegetation: Total herbaceous cover is > 30% dominated by *Carex lugens.* Total dwarf shrub cover is > 25%. This is a provisional association because dwarf shrub co-dominance varies from *Rhododendron tomentosum* with *Vaccinium vitis-idaea* to *Salix arctica* with *Salix reticulata* to *Arctous alpina* with *Vaccinium vitis-idaea.* Other herbaceous species may include *Eriophorum angustifolium, Equisetum*

arvense and *Petasites frigidus*. Moss cover may be high and include *Aulacomnium, Catoscopium nigritum, Dicranum spadiceum, Hylocomium splendens,* and *Tomentypnum nitens.* Lichen cover is low, typically below 10% cover, and exposed rock and mineral soil are uncommon.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	3	33
Arctous rubra	0	33
Betula nana	1	67
Cassiope tetragona	2	67
Dryas octopetala	2	33
Empetrum nigrum	1	67
Rhododendron tomentosum	10	67
Salix arctica	5	33
Salix glauca	0	33
Salix phlebophylla	0	33
Salix pulchra	5	67
Salix reticulata	7	33
Vaccinium uliginosum	1	33
Vaccinium vitis-idaea	10	67
Forb		
Equisetum arvense	7	33
Equisetum scirpoides	0	33
Equisetum variegatum	2	33
Pedicularis labradorica	0	33
Pedicularis langsdorffii	0	33
Petasites frigidus var. *sagittatus*	1	33
Polygonum bistorta	0	67
Pyrola asarifolia	0	33
Pyrola secunda	0	33
Graminoid		
Arctagrostis latifolia ssp. *latifolia*	0	33
Carex lugens	47	100
Eriophorum angustifolium	3	33
Eriophorum vaginatum	3	67
Poa arctica	0	33
Lichen		
Asahinea chrysantha	0	33
Cladina rangiferina	0	33
Cladonia	2	33
Cladonia uncialis	0	33
Flavocetraria cucullata	1	67
Flavocetraria nivalis	0	67
Lichen, crustose	2	33
Masonhalea richardsonii	0	67
Nephroma arcticum	0	33
Peltigera	2	33
Sphaerophorus globosus	2	33
Thamnolia vermicularis	0	33
Pleuroclada albescens	3	33
Moss		
Aulacomnium turgidum	7	67
Catoscopium nigritum	7	33
Dicranum spadiceum	3	33
Drepanocladus	3	33
Hylocomium splendens	5	67
Pleurozium schreberi	0	33
Polytrichum piliferum	2	33
Ptilium crista-castrensis	0	33
Sphagnum	0	33
Sphagnum fuscum	2	33
Tomentypnum nitens	17	67

***Equisetum arvense/Salix reticulata* Plant Association**
Common horsetail/Netleaf willow Plant Association

Plots sampled: 3
Rank: GNR; SNR

Equisetum arvense/Salix reticulata Plant Association on a sideslope in Brooks Range above the Atigun River, Alaska.

Other studies: Not previously described.
Distribution: This is a common association located on slopes throughout the Brooks Range and Brooks Range Foothills.
Patch size: Small
Elevation: 2 to 915 m and higher
Slope: 9 to 12°
Landform: This association is common on stable wet side-slopes underlain by permafrost.
Hydrology: Wet to mesic.
Soil: Soils are a 1 to 16 cm thick organic horizon over A/B horizon, often mixed with rock. The pH of one site is 6.8. Permafrost likely occurs in all sites. The water level is 1 to 30 cm deep.
Landcover class: Mesic Sedge-dwarf Shrub Tundra
Vegetation: Total herbaceous cover is > 30% dominated by *Equisetum arvense*. Total dwarf shrub cover is > 25% and *Salix reticulata* often dominates. Other common dwarf shrubs include *Cassiope tetragona, Dryas octopetala, Salix arctica, Salix pulchra,* and *Vaccinium uliginosum.* Other herbaceous species may

Species	Cov %	Con %
Shrub		
Cassiope tetragona	2	67
Dryas octopetala	5	100
Rhododendron lapponicum	0	33
Salix arctica	3	33
Salix pulchra	3	67
Salix reticulata	30	100
Salix rotundifolia	1	33
Vaccinium uliginosum	13	33
Forb		
Anemone narcissiflora	0	33
Equisetum arvense	38	100
Eutrema edwardsii	0	33
Hedysarum	0	33
Lagotis glauca	0	33
Pedicularis	1	67
Petasites frigidus	2	100
Polygonum bistorta	4	100
Polygonum viviparum	0	33
Potentilla biflora	0	33
Saussurea angustifolia	0	33
Saxifraga hirculus	0	33
Saxifraga nelsoniana	0	33
Stellaria	0	33
Tephroseris atropurpurea ssp. *frigida*	0	33
Tofieldia pusilla	0	67
Graminoid		
Arctagrostis latifolia ssp. *latifolia*	0	67
Carex albonigra	7	33
Carex aquatilis	0	33
Carex lugens	4	67
Carex misandra	0	33
Carex scirpoidea	2	33
Eriophorum angustifolium	2	33
Eriophorum vaginatum	1	33
Festuca brachyphylla	0	33
Luzula	0	33
Poa arctica	1	67
Lichen		
Cladina rangiferina	1	33
Flavocetraria cucullata	1	67
Flavocetraria nivalis	1	33
Masonhalea richardsonii	0	67
Peltigera	0	33
Thamnolia vermicularis	0	33
Tetralophozia setiformis	3	13
Moss		
Aulacomnium palustre	15	67
Calliergon giganteum	2	33
Catoscopium nigritum	7	33
Hylocomium splendens	12	67
Polytrichum hyperboreum	3	33
Racomitrium lanuginosum	1	33
Sarmenthypnum sarmentosum	2	33
Sphagnum	3	33
Tomentypnum nitens	22	33

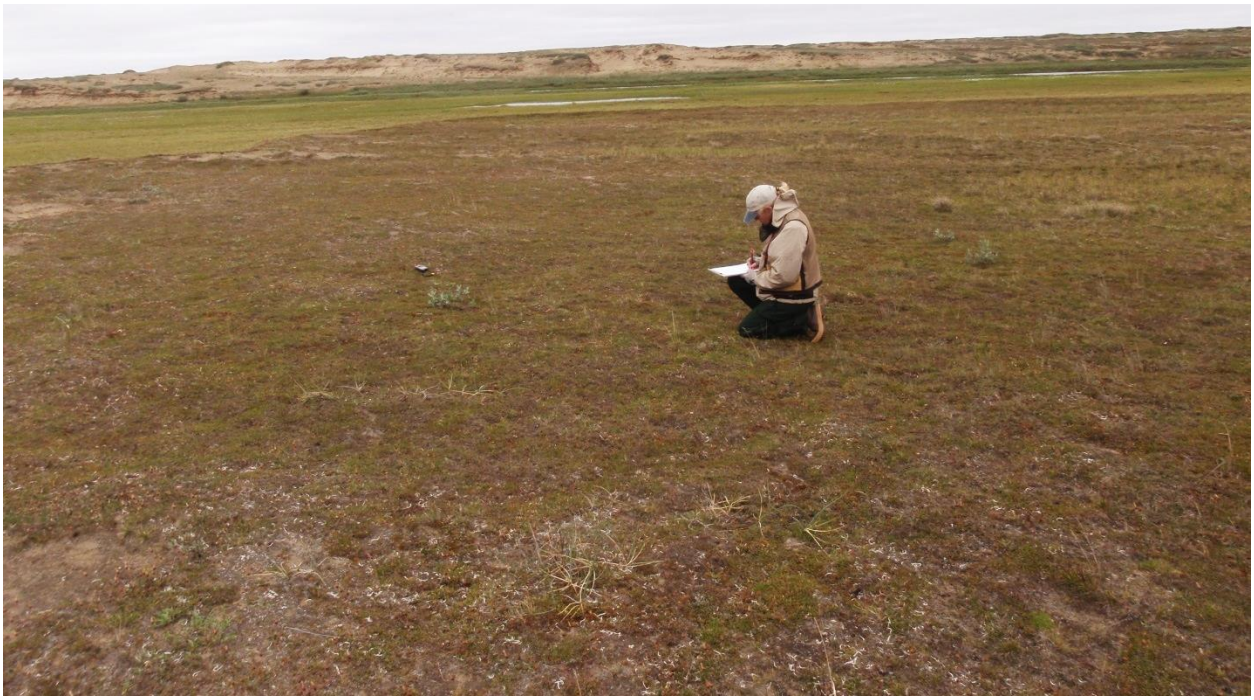
include *Arctagrostis latifolia, Carex albonigra, Carex lugens, Poa arctica* and *Petasites frigidus*. Moss cover may be high and include *Aulacomnium, Catoscopium nigritum, Hylocomium splendens,* and *Tomentypnum nitens.* Lichen cover is low, typically below 10%, and exposed rock and mineral soil are uncommon.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Dwarf Shrub-Dryas Plant Associations

***Dryas integrifolia-Salix reticulata* (Floodplain) Plant Association**
Entire-leaf mountain avens-Netleaf willow (Floodplain) Plant Association

Plots sampled: 6
Rank: G5; S5



Dryas integrifolia-Salix reticulata (Floodplain) Plant Association on a river terrace north of Inigok, Alaska.

Other studies: Similar to the *Dryas integrifolia-Salix reticulata* and *Dryas integrifolia-Salix phlebophylla* river terrace associations (Jorgenson et al. 1994), and *Dryas integrifolia-Lupinus arcticus* (Walker et al. 1997) association.
Distribution: Common association found on active and inactive floodplains of the Coastal Plain, Brooks Range Foothills and Brooks Range.
Patch size: Small patch. Typically linear on streams.
Elevation: 4 to 633 m
Slope: 0 to 2°
Landform: active and inactive floodplain terraces
Hydrology: Dry to mesic
Soil: The soils are a thin organic horizon over a sandy C or B horizon. Permafrost occurs, but typically deeper than 40 cm and the water table is deeper than 40 cm. The pH ranges from 6.4 to 7.1.
Landcover class: Dwarf Shrub-Dryas
Vegetation: Species composition is highly variable. *Dryas integrifolia* dominates or co-dominates with other shrubs such as *Andromeda polifolia, Arctous rubra, Betula nana, Salix phlebophylla, Salix reticulata* or *Vaccinium uliginosum*. It may also co-dominate with herbaceous species such as *Carex lugens, Carex membranacea, Carex scirpoidea* and *Equisetum arvense*. Total moss cover ranges up to 65% and may include *Aulacomnium turgidem, Drepanocladus* spp., *Hylocomium splendens* and *Sanionia uncinata*. Total lichen cover is typically sparse.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	2	17
Arctostaphylos alpina	0	17
Arctous rubra	5	33
Betula nana	3	67
Cassiope tetragona	1	50
Dasiphora fruticosa	0	33
Dryas integrifolia	27	100
Rhododendron tomentosum	1	33
Rhododendron lapponicum	0	33
Salix alaxensis	3	17
Salix arctica	1	33
Salix glauca	5	67
Salix phlebophylla	2	33
Salix pulchra	0	33
Salix reticulata	5	83
Vaccinium uliginosum	9	67
Forb		
Aconitum delphiniifolium	0	17
Anemone parviflora	0	50
Armeria maritima	0	17
Artemisia arctica	0	17
Artemisia glomerata	0	17
Aster	0	17
Astragalus alpinus	0	17
Astragalus umbellatus	0	33
Castilleja	0	17
Castilleja elegans	0	17
Chamerion latifolium	0	17
Equisetum arvense	3	33
Equisetum scirpoides	0	17
Hedysarum alpinum	0	33
Hulteniella integrifolia	0	33
Lagotis glauca	0	17
Lagotis minor	0	17
Lupinus arcticus	0	17
Minuartia arctica	0	17
Oxytropis borealis var. *viscida*	0	17
Oxytropis maydelliana	0	17
Papaver macounii	0	17
Parnassia palustris	0	17
Parrya nudicaulis	0	17
Pedicularis lanata	0	17
Polygonum bistorta	0	33
Polygonum viviparum	0	50
Potentilla biflora	0	17
Potentilla furcata	2	17
Pyrola	1	17
Saussurea angustifolia	0	50
Saxifraga hirculus	0	17
Saxifraga oppositifolia	0	17
Silene acaulis	0	33
Sparganium angustifolium	0	17
Stellaria	0	17
Thalictrum alpinum	0	17
Tofieldia pusilla	0	17
Wilhelmsia physodes	0	17
Zigadenus elegans	0	17
Graminoid		
Arctagrostis latifolia	1	50
Arctagrostis latifolia-latifolia	0	17
Calamagrostis purpurascens	0	17
Carex krausei	0	17
Carex lugens	5	50
Carex membranacea	3	33
Carex podocarpa	2	17
Carex scirpoidea	4	67
Festuca altaica	1	17
Juncus triglumis	0	17
Kobresia myosuroides	0	17
Koeleria asiatica	0	33
Leymus mollis	0	17
Poa arctica	0	17
Lichen		
Cetrariella delisei	3	17
Cladina rangiferina	0	17
Dactylina arctica	0	33
Flavocetraria cucullata	0	17
Flavocetraria nivalis	2	33
Lichen	1	33
Lichen, crustose	0	33
Masonhalea richardsonii	0	50
Stereocaulon	0	17
Thamnolia vermicularis	0	33
Moss		
Aulacomnium turgidum	5	17
Drepanocladus	1	17
Hylocomium splendens	5	17
Leptobryum	1	17
Moss	6	50
Polytrichum	1	17
Sanionia uncinata	11	17
Sphagnum rubellum	0	17
Tomentypnum nitens	1	17

***Dryas integrifolia* (Upland) Plant Association**
Entire-leaf mountain avens (Upland) Plant Association

Plots sampled: 2
Rank: G5; S5

Dryas integrifolia (Upland) Plant Association with *Dryas integrifolia* in the foreground mixed with *Cassiope tetragona* in central Brooks Range, Alaska.

Other studies: Similar to the *Dryas integrifolia-Salix reticulata-Equisetum* and *Dryas integrifolia-Cassiope tetragona* associations on *Dryas*-Graminoid alpine tundra (Jorgenson et al. 1994) and the *Dryas integrifolia* (Boggs et al. 1999) association.
Distribution: This is an uncommon association found in the Brooks Range and Brooks Range Foothills.
Environment: This association is common on calcareous side-slopes, rounded hills with extensive exposed soil and fell field. The slope is 0 to 27° and steeper. Patch size is small to large. The one soil pH sampled is 9.4.
Landcover class: Dwarf Shrub-Dryas
Vegetation: Exposed rock and mineral soil are common on the more unstable sites such as talus slopes and areas with intense frost sorting. *Dryas integrifolia* dominates and co-dominates with other shrubs such as *Cassiope tetragona*. Herbaceous, moss and lichen cover are typically sparse.
Herbaceous species may include *Pedicularis* spp. and *Polygonum viviparum.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Arctous rubra	0	50
Cassiope tetragona	20	50
Dryas integrifolia	48	100
Salix arctica	1	50
Salix reticulata	1	50
Vaccinium uliginosum	1	50
Forb		
Androsace chamaejasme	0	50
Anemone drummondii	0	50
Anemone parviflora	0	50
Antennaria	0	50
Astragalus alpinus	0	50
Chamerion latifolium	0	50
Minuartia arctica	0	50
Oxytropis borealis	0	50
Oxytropis nigrescens	1	50
Pedicularis	0	100
Polygonum viviparum	0	100
Silene acaulis	0	50
Tofieldia pusilla	0	50
Graminoid		
Carex scirpoidea	0	50
Poa	0	50
Lichen		
Dactylina arctica	0	50
Lichen, crustose	5	50
Thamnolia vermicularis	2	100
Moss		
Hylocomium splendens	5	50
Moss	0	50
Tomentypnum nitens	0	50

***Dryas octopetala-Cassiope tetragona* Plant Association**
Eightpetal mountain-avens-White arctic mountain heather Plant Association

Plots sampled: 13
Rank: G5; S5

Dryas octopetala-Cassiope tetragona Plant Association on a sideslope in western Brooks Range, Alaska.

Other studies: Similar to the *Dryas octopetala-Cassiope tetragona* (Craighead et al. 1988, Boggs et al. 1999) association, and the *Dryas octopetala (Dryas integrifolia)-Silene acualis* (MacKenzie et al. 2014 [in prep]) association.
Distribution: This is a common association located throughout the Brooks Range, Brooks Range Foothills and sometimes river terraces.
Patch size: Small to large
Elevation: 71 to 942 m
Slope: 0 to 50° and steeper
Landform: This association occurs on rounded hilltops, side-slopes, and sometimes inactive floodplain terraces.
Hydrology: Dry to mesic
Soil: On rounded hilltops and side-slopes, the soils have a thin organic horizon (1 to 10 cm) over sand and rock (lithosols), sometimes with A and B horizon development. The pH varies from 4.5 on more mesic or organic rich soils to 7.2 on drier soils and also calcareous sites. The one floodplain site is a C sand horizon and a pH of 8.0.

Landcover class: Dwarf Shrub-Dryas
Vegetation: Exposed rock and mineral soil are common on the more unstable sites such as talus slopes and areas with intense frost sorting. Species diversity is high (119 species) and only species with > 1% cover are given in the table. *Dryas octopetala* co-dominates with other shrubs including *Arctous alpina, Arctous rubra, Betula nana, Cassiope tetragona, Diapensia lapponica, Rhododendron lapponicum, Salix reticulata,* and *Salix arctica.* Total herbaceous cover is < 25%. Some herbaceous species include *Anthoxanthum monticola* ssp. *alpinum, Carex scirpoidea,* and *Kobresia myosuroides.* Moss cover may be high on more stable sites and include *Hylocomium splendens* and *Rhytidium rugosum.* Lichen cover may also be high and include *Cetraria* spp., *Flavocetraria* spp. and *Thamnolia vermicularis.*

The following tabulation lists the species with > 1% canopy cover that occur in this association and gives the average cover (Cov %) percent and constancy (Con %) percent.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	4	23
Arctous rubra	3	38
Betula nana	3	38
Cassiope tetragona	12	69
Diapensia lapponica	2	23
Dryas octopetala	26	100
Rhododendron lapponicum	2	31
Salix arctica	1	38
Salix glauca	1	8
Salix phlebophylla	1	38
Salix reticulata	6	77
Vaccinium uliginosum	1	62
Vaccinium vitis-idaea	1	46
Forb		
Saxifraga nelsoniana	1	23
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	1	46
Carex scirpoidea	1	46
Kobresia	1	8
Lichen		
Cetraria	1	8
Flavocetraria nivalis	1	31
Lichen	2	23
Lichen, crustose	1	15
Stereocaulon	1	15
Thamnolia vermicularis	2	38
Liverwort		
Pleuroclada albescens	0	8
Moss		
Abietinella abietina	1	15
Aulacomnium	1	8
Ditrichum flexicaule	1	15
Hylocomium splendens	7	38
Moss	2	31
Rhytidium rugosum	5	23

***Dryas octopetala-Salix phlebophylla* Plant Association**
Eightpetal mountain-avens-Skeletonleaf willow Plant Association

Plots sampled: 19
Rank: G5; S5

Dryas octopetala-Salix phlebophylla Plant Association on a sideslope in central Brooks Range, Alaska.

Other studies: Similar to the *Dryas octopetala* (Hanson 1953), *Dryas octopetala-Selaginella sibirica* (Walker et al. 1994), *Dryas octopetala (Dryas integrifolia)-Silene acualis* (MacKenzie et al. 2014 [in prep]) associations and numerous other studies.
Distribution: This is a common association located throughout the Brooks Range, Brooks Range Foothills and sometimes river terraces.
Patch size: Small to large
Elevation: 71 to 1,334 m
Slope: 0 to 32° and steeper
Landform: This association is common on unstable surfaces such as talus slopes, rounded foothills, areas of intense frost action in high mountain valley floors, and slopes below bedrock outcrops.
Hydrology: Dry to mesic
Soil: The soils are often lithosols with sand, gravel and rocks, and a thin organic horizon may occur. The pH varies from 4.5 on more mesic or organic rich soils to 7.2 on drier soils and also calcareous sites.
Landcover class: Dwarf Shrub-Dryas

Vegetation: Exposed rock and mineral soil are common on the more unstable sites such as talus slopes and areas with intense frost sorting. *Dryas octopetala* dominates and other shrubs are not co-dominant. Species richness is high (141 species); consequently only species with > 1% cover are given in the table. Some other dwarf shrubs include *Arctous alpina, Betula nana, Cassiope tetragona, Diapensia lapponica, Salix phlebophylla,* and *Salix arctica.* Total herbaceous cover is < 25%. Herbaceous species may include *Anthoxanthum monticola* ssp. *alpinum, Carex scirpoidea, Minuartia macrocarpa, Pedicularis* spp., and *Silene acaulis.* Moss cover may be high on more stable sites and include *Polytrichum* spp. and *Dicranum* spp. Lichen cover may also be high and include *Asahinea chrysantha, Cetraria* spp., *Pseudephebe pubescens* and *Umbilaria* spp.

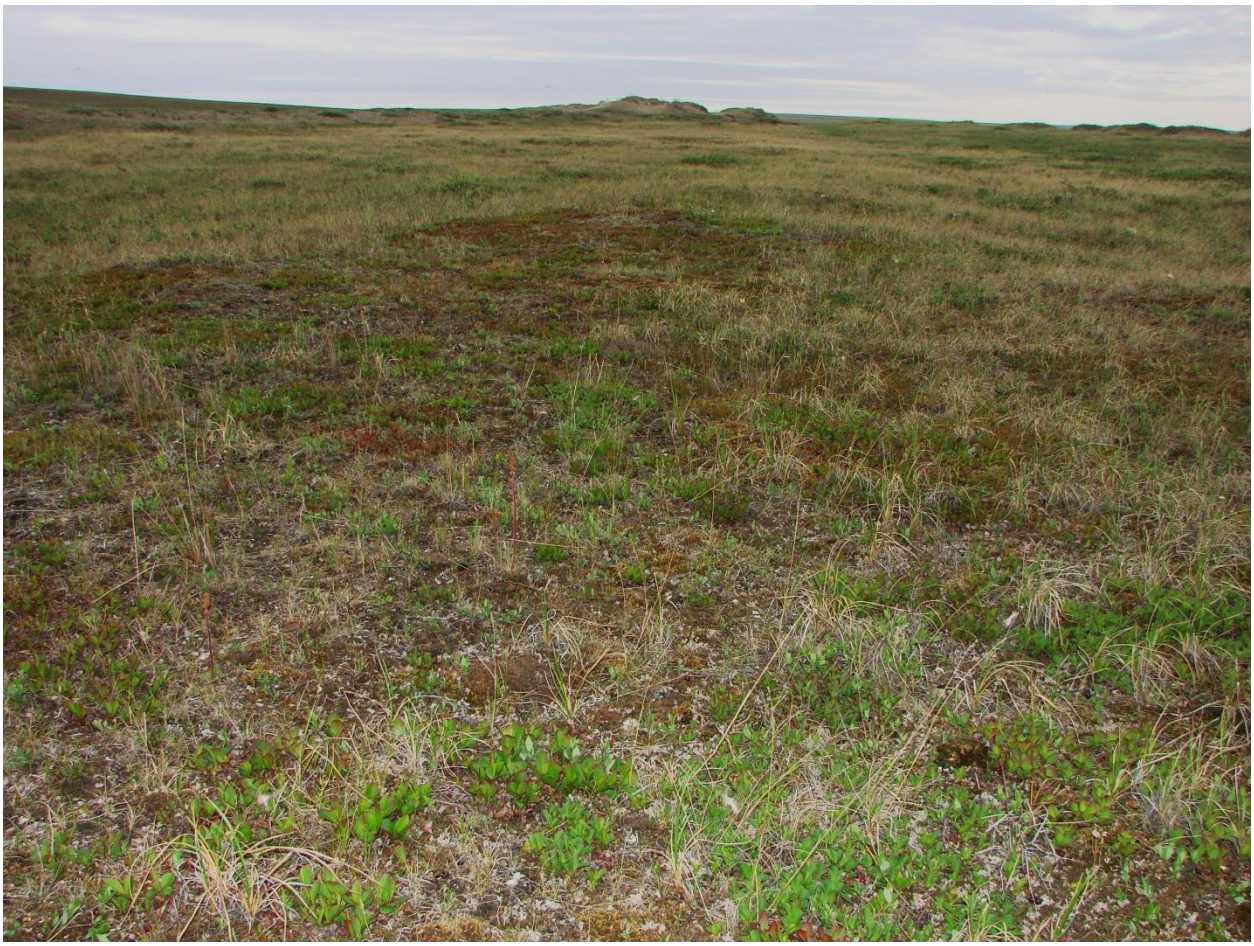
The following tabulation lists the species with > 1% canopy cover that occur in this association and gives the average cover (Cov %) percent and constancy (Con %) percent.

Species	Cov %	Con %
Shrub		
Arctostaphylos alpina	1	11
Dryas octopetala	45	100
Salix arctica	1	42
Salix phlebophylla	2	53
Salix pulchra	1	16
Forb		
Selaginella sibirica	1	11
Graminoid		
Carex microchaeta	1	21
Carex scirpoidea	2	37
Kobresia myosuroides	1	16
Lichen		
Asahinea chrysantha	1	21
Cetraria	1	16
Flavocetraria cucullata	1	21
Flavocetraria nivalis	1	37
Lichen species	1	16
Lichen, crustose	1	16
Melanelia	2	11
Pseudephebe pubescens	2	11
Sphaerophorus globosus	1	11
Thamnolia vermicularis	1	42
Umbilicaria hyperborea	1	5
Umbilicaria proboscidea	1	5
Liverwort		
Anthelia juratzkana	1	5
Moss		
Dicranum spadiceum	1	5
Distichium capillaceum	1	5
Moss	4	37
Polytrichum	1	5
Polytrichum piliferum	1	16
Racomitrium lanuginosum	1	26
Cryptobiotic crust	2	11

Dwarf Shrub-Other Plant Associations

***Arctous rubra-Carex aquatilis* Plant Association**
Red fruit bearberry-Water sedge Plant Association

Plots sampled: 2
Rank: GNR; SNR



Arctous rubra-Carex aquatilis Plant Association on an inactive floodplain terrace south of Wainwright, Alaska.

Other studies: Similar to the *Arctostaphylos rubra-Cladina stellaris* (Webber et al. 1978).
Distribution: Coastal plain and active and inactive floodplain terraces. Uncommon.
Environment: This association occurs on low elevation, mesic dune slacks or inactive floodplain terraces. The soils have a shallow (3 cm) organic horizon over sand. The pH ranges from 6.4 to 6.7.
Landcover class: Dwarf Shrub-other
Vegetation: *Arctous rubra* dominates or co-dominates with other dwarf shrubs such as *Betula nana, Cassiope tetragona*, and *Salix pulchra*. *Carex aquatilis* is common, and moss cover is moderate and may include *Ditrichum* spp., *Hylocomium splendens* and *Sanionia uncinata*.

Species	Cov %	Con %
Shrub		
Arctous rubra	20	100
Betula nana	5	50
Cassiope tetragona	10	50
Dryas integrifolia	1	50
Empetrum nigrum	3	50
Rhododendron tomentosum	3	50
Salix hastata	3	50
Salix phlebophylla	1	50
Salix pulchra	5	50
Salix reticulata	1	50
Vaccinium uliginosum	1	50
Vaccinium vitis-idaea	3	50
Forb		
Androsace chamaejasme	0	50
Armeria maritima ssp. *sibirica*	0	50
Equisetum arvense	1	50
Pedicularis capitata	0	50
Pyrola asarifolia	0	50
Saxifraga hieraciifolia	0	50
Saxifraga nelsoniana	0	50
Tofieldia pusilla	0	50
Graminoid		
Alopecurus alpinus	0	50
Anthoxanthum monticola ssp. *alpinum*	1	50
Bromus inermis ssp. *pumpellianus* var. *arcticus*	2	50
Carex aquatilis	15	100
Carex stylosa	0	50
Juncus arcticus ssp. *alaskanus*	1	50
Leymus mollis	1	50
Luzula confusa	0	50
Poa arctica	3	50
Lichen		
Cladonia	1	50
Dactylina arctica	2	50
Flavocetraria nivalis	1	50
Lichen, crustose	5	50
Peltigera	1	100
Stereocaulon	1	100
Thamnolia vermicularis	1	50
Moss		
Aulacomnium turgidum	5	50
Dicranum acutifolium	5	50
Ditrichum	10	50
Hylocomium splendens	15	100
Polytrichum	3	50
Sanionia uncinata	18	50

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

***Cassiope tetragona-Vaccinium uliginosum* Plant Association**
White arctic mountain heather-Bog blueberry Plant Association

Plots sampled: 6
Rank: G5; S5

Cassiope tetragona-Vaccinium uliginosum Plant Association on a sideslope in Brooks Range above Galbraith Lake, Alaska.

Other studies: Similar to *Cassiope tetragona-Vaccinium uliginosum*-mosses (Hanson 1953), *Cassiope tetragona-Carex microchaeta* (Walker et al. 1994), *Cassiope tetragona-Cetraria-Cladina* and the *Cassiope tetragona -Vaccinium uliginosum-Ledum* (MacKenzie et al. 2014 [in prep]) associations, and several other studies.
Distribution: This is a common association located throughout the Brooks Range, Brooks Range Foothills and slopes above rivers.
Patch size: Small to large
Elevation: 11 to 1,174 m
Slope: 5 to 30° and steeper
Landform: This association is common on stable side-slopes, rounded mountain ridges and slopes adjacent to rivers.
Hydrology: Mesic
Soil: In the alpine, the soils are typically a thin organic horizon over A/B horizon mixed with rock. On floodplains the soils are typically a thin organic horizon over A/B horizon. The pH ranges from 4.9 to 5.4.
Landcover class: Dwarf Shrub-other

Vegetation: *Cassiope tetragona* dominates or co-dominates with *Betula nana, Salix phlebophylla, Vaccinium uliginosum* and *Vaccinium vitis-idaea.* Total herbaceous cover is < 40% and may include *Anthoxanthum monticola* ssp. *alpinum, Carex lugens, Carex microchaeta* and *Saxifraga nelsoniana.* Moss cover may be high and include *Aulacomnium* spp., *Dicranum* spp., *Hylocomium splendens, Polytrichum* spp. and *Sphagnum* spp. Lichen cover may also be high and include crustose lichens, *Cetraria* or *Cladina* spp. and *Dactylina arctica*.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Alnus viridis ssp. *fruticosa*	0	17
Betula nana	3	33
Cassiope tetragona	30	100
Diapensia lapponica	3	50
Dryas octopetala	1	50
Rhododendron tomentosum	2	67
Rhododendron lapponicum	1	17
Salix arctica	0	17
Salix glauca	2	17
Salix phlebophylla	8	67
Salix pulchra	1	33
Salix reticulata	3	50
Vaccinium uliginosum	9	67
Vaccinium vitis-idaea	6	67
Forb		
Anemone parviflora	0	17
Boykinia richardsonii	1	33
Dodecatheon frigidum	0	17
Huperzia selago	0	17
Lupinus arcticus	2	17
Minuartia	0	17
Oxytropis maydelliana	1	17
Papaver macounii	0	17
Pedicularis capitata	0	17
Pedicularis langsdorffii	0	17
Polygonum bistorta	1	50
Polygonum viviparum	0	17
Pyrola asarifolia	0	17
Pyrola secunda	0	17
Saussurea angustifolia	0	17
Saxifraga bronchialis	0	17
Saxifraga nelsoniana	0	33
Silene acaulis	0	17
Stellaria longifolia	0	17
Stellaria longipes	0	17
Graminoid		
Anthoxanthum monticola-alpinum	1	50
Arctagrostis latifolia	0	33
Carex lugens	0	33
Carex microchaeta ssp. *nesophila*	1	17
Carex scirpoidea	1	17
Carex vaginata	1	17
Dupontia fisheri	0	17
Eriophorum vaginatum	1	17
Festuca altaica	1	17
Luzula confusa	0	50
Poa pratensis ssp. *alpigena*	1	17
Lichen		
Alectoria ochroleuca	0	17
Cetraria ericetorum	1	33
Cetraria islandica	3	17
Cladina	3	17
Cladina arbuscula	1	17
Cladina rangiferina	1	33
Cladonia gracilis	1	17
Dactylina arctica	1	67
Flavocetraria cucullata	1	50
Flavocetraria nivalis	1	33
Lichen	5	17
Lichen, crustose	5	33
Masonhalea richardsonii	0	33
Peltigera	0	17
Stereocaulon	0	17
Thamnolia vermicularis	2	33
Liverwort	3	17
Ptilidium ciliare	3	17
Moss		
Aulacomnium turgidum	2	17
Dicranum spadiceum	8	50
Drepanocladus	1	17
Hylocomium splendens	17	67
Moss	3	17
Polytrichum hyperboreum	0	17
Racomitrium lanuginosum	1	17
Sphagnum	3	33

***Salix arctica-Salix polaris* Plant Association**
Arctic willow-Polar willow Plant Association

Plots sampled: 2
Rank: GNR; SNR


Salix arctica-Salix polaris Plant Association near Wainwright on the Coastal Plain, Alaska.

Other studies: Similar to the *Salix arctica-Carex aquatilis-Scorpidium* (MacKenzie et al. 2014 [in prep]) association.
Distribution: Coastal plain. Uncommon.
Environment: This association occurs on low elevation high-center polygons. Decadent tussocks typically occur indicating these sites were once wetter, supporting tussock tundra on polygonal ground. The soil surface has a white lumpy appearance due to moss polsters of *Dicranum elongatum* covered by the white lichen *Ochrolechia* spp. (Webber 1978).
Landcover class: Dwarf Shrub-other
Vegetation: *Salix arctica* dominates or co-dominates with other dwarf shrubs such as *Salix polaris*. Herbaceous cover is sparse and may include *Eriophorum vaginatum* and *Luzula confusa*. Lichen cover is sparse and may include *Cetraria islandica* and *Cladonia* spp. Moss cover is moderate and may include *Aulacomnium* spp., *Dicranum groenlandicum* and *Polytrichum* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Cassiope tetragona	1	50
Salix arctica	23	100
Salix polaris	12	100
Salix pulchra	0	50
Vaccinium vitis-idaea	1	50
Forb		
Pedicularis langsdorffii	0	50
Graminoid		
Carex aquatilis	1	50
Carex misandra	1	50
Eriophorum vaginatum	3	50
Luzula confusa	5	50
Poa	2	100
Lichen		
Alectoria ochroleuca	0	50
Bryocaulon divergens	0	50
Cetraria	1	50
Cetraria islandica	2	50
Cladina rangiferina	0	50
Cladonia	5	50
Cladonia ecmocyna	0	50
Dactylina arctica	1	100
Flavocetraria cucullata	0	50
Flavocetraria nivalis	1	50
Peltigera	0	50
Peltigera aphthosa	0	50
Thamnolia vermicularis	1	100
Moss		
Aulacomnium	15	50
Aulacomnium palustre	1	50
Bryum pseudotriquetrum	0	50
Dicranum	3	50
Dicranum groenlandicum	10	50
Distichium capillaceum	1	50
Drepanocladus	2	50
Moss	2	50
Oncophorus wahlenbergii	0	50
Polytrichum	11	100
Tomentypnum nitens	0	50

***Salix phlebophylla-Carex lugens* Plant Association**
Skeletonleaf willow-Spruce muskeg sedge Plant Association

Plots sampled: 2
Rank: G5; S5

Salix phlebophylla-Carex lugens Plant Association on a sideslope in Brooks Range above Galbraith Lake, Alaska.

Other studies: Similar to the *Salix phlebophylla-Arctous alpina* and *Salix phlebophylla-Vaccinium uliginosum* (Walker et al. 1994) associations.
Distribution: This is an uncommon association in the Brooks Range and Brooks Range Foothills.
Patch size: Small to large
Elevation: 11 to 1,310 m
Slope: 0 to 16° and steeper
Landform: This association occurs on mountain ridges and slopes.
Hydrology: Dry to mesic
Soil: The soils are a thin organic horizon over sand/silt mixed with rock (lithosols). The pH on one site is 4.4.
Landcover class: Dwarf Shrub-other
Vegetation: Exposed rock and mineral soil are common on the more unstable sites such as talus slopes and areas with intense frost sorting. *Salix phlebophylla* dominates. Common sub-dominant shrubs include *Cassiope tetragona, Dryas octopetala,* and *Diapensia lapponica.* Total herbaceous cover is < 40% and may include *Anthoxanthum monticola* ssp. *alpinum, Carex lugens,* and *Petasites frigidus.* Moss cover may be high on more stable sites and include *Aulacomnium turgidum* and *Hylocomium splendens.* Lichen cover is sparse.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Cassiope tetragona	8	100
Diapensia lapponica	6	100
Dryas octopetala	15	100
Salix phlebophylla	23	100
Salix pulchra	1	50
Salix reticulata	3	50
Vaccinium uliginosum	3	50
Vaccinium vitis-idaea	0	50
Forb		
Arnica lessingii	2	50
Geum glaciale	0	50
Minuartia macrocarpa	0	50
Oxytropis kokrinensis	0	50
Oxytropis nigrescens ssp. *bryophila*	0	50
Oxytropis scammaniana	0	50
Pedicularis	0	50
Petasites frigidus	0	100
Polygonum bistorta	3	100
Saxifraga bronchialis	1	50
Saxifraga nelsoniana	0	50
Saxifraga serpyllifolia	0	50
Silene acaulis	0	50
Stellaria longipes ssp. *longipes*	0	50
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	2	100
Calamagrostis lapponica	3	50
Carex lugens	8	100
Luzula confusa	3	50
Poa arctica	2	50
Trisetum spicatum	0	50
Lichen		
Asahinea chrysantha	1	50
Cladina rangiferina	2	50
Dactylina arctica	0	50
Flavocetraria cucullata	1	50
Flavocetraria nivalis	1	50
Lichen	1	50
Lobaria linita	0	50
Ochrolechia	2	50
Sphaerophorus globosus	2	50
Stereocaulon	1	50
Thamnolia vermicularis	1	50
Moss		
Aulacomnium turgidum	5	50
Hylocomium splendens	30	50
Moss	8	50
Pohlia	1	50
Polytrichum piliferum	1	50
Racomitrium lanuginosum	1	50
Sphagnum	3	50
Tortella tortuosa	3	50

***Salix rotundifolia* Plant Association**
Least willow Plant Association

Plots sampled: 3
Rank: GNR; SNR

Salix rotundifolia Plant Association in the Brooks Range Foothills near the Dalton Highway, Alaska.

Other studies: Similar to the *Salix rotundifolia-Cetrariella delisei* (Elias et al. 1996), *Salix rotundifolia-Oxyria digyna* (Anderson 1974) and *Salix rotundifolia* subtype *Ranunculus nivalis* (Walker et al. 1989) associations.
Distribution: This is an uncommon association in the Brooks Range, Brooks Range Foothills and Coastal Plain.
Patch size: Small to large
Elevation: 12 to 740 m
Slope: 1 to 8°
Landform: This association occurs on side-slopes above floodplains and on high-center polygons.
Hydrology: Mesic
Soil: Soils typically have a thin organic horizon over silt, sand and cobble. Permafrost not reached at 40 cm deep. The pH ranges from 4.6 to 6.5.
Landcover class: Dwarf Shrub-other
Vegetation: *Salix rotundifolia* dominates. Other common shrubs may include *Dryas integrifolia, Dryas octopetala* and *Betula nana*. Herbaceous cover is typically sparse and may include *Boykinia richardsonii, Arctagrostis latifolia, Carex aquatilis* and *Kobresia myosuroides*. Lichen cover is moderate and may include *Alectoria nigricans, Cetrariella delisei, Flavocetraria cucullata,* and *Thamnolia vermicularis.* Moss cover ranges from sparse to high and may include *Sanionia uncinata* and *Tomentypnum nitens.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	2	33
Dryas integrifolia	2	33
Dryas octopetala	3	33
Salix pulchra	0	33
Salix rotundifolia	28	100
Vaccinium uliginosum	0	33
Forb		
Anemone narcissiflora	0	33
Antennaria friesiana	0	33
Artemisia arctica	0	33
Boykinia richardsonii	2	33
Draba corymbosa	0	33
Equisetum arvense	0	33
Lupinus arcticus	1	33
Minuartia obtusiloba	0	33
Oxyria digyna	0	33
Papaver macounii	0	33
Pedicularis lanata	0	33
Petasites frigidus var. *sagittatus*	0	33
Polygonum bistorta	2	33
Polygonum viviparum	0	67
Saxifraga hieraciifolia	0	33
Saxifraga nelsoniana	0	33
Saxifraga oppositifolia	0	33
Stellaria longipes	0	33
Stellaria longipes ssp. *Longipes*	0	33
Tephroseris atropurpurea ssp. *frigida*	0	33
Wilhelmsia physodes	0	33
Graminoid		
Alopecurus magellanicus	0	33
Anthoxanthum monticola ssp. *alpinum*	1	33
Arctagrostis latifolia	5	67
Carex aquatilis	3	33
Carex lachenalii	2	33
Carex microchaeta	0	33
Carex microchaeta ssp. *nesophila*	0	33
Carex podocarpa	3	33
Kobresia myosuroides	5	33
Luzula arcuata ssp. *unalaschcensis*	2	33
Luzula confusa	0	67
Poa arctica ssp. *arctica*	0	33
Poa glauca	1	33
Trisetum spicatum	0	33
Lichen		
Alectoria nigricans	2	33
Bryocaulon divergens	1	33
Cetraria islandica	1	33
Cetrariella delisei	3	33
Cladina	0	33
Dactylina arctica	2	33
Flavocetraria cucullata	3	67
Flavocetraria nivalis	2	33
Lichen	7	33
Lichen, crustose	0	33
Nephroma arcticum	0	33
Sphaerophorus globosus	0	33
Stereocaulon	1	33
Thamnolia vermicularis	2	33
Moss		
Dicranum elongatum	3	33
Moss	7	67
Racomitrium lanuginosum	1	33
Sanionia uncinata	23	33
Tomentypnum nitens	5	33

Freshwater Marsh *Arctophila fulva* Plant Association

***Arctophila fulva* Plant Association**
Pendent grass Plant Association

Plots sampled: 8
Rank: G5; S5

Arctophila fulva Plant Association near Point Hope, Alaska.

Other studies: Similar to the *Arctophila fulva* (Clebsch 1957, MacKenzie et al. 2014 [in prep]) associations and several other studies.
Distribution: Common on the Coastal Plain, less common in the Brooks Range Foothills and rare in the Brooks Range.
Patch size: Small to large
Elevation: 1 to 910 m
Slope: 0°
Landform: Occurs on marsh edges and wet edges of thaw lakes and other lakes.
Hydrology: Wet, typically with standing water 0.1 to 1 m deep. Water depth varies depending on flooding and precipitation.
Soil: Standing water over muck, organic matter, silt or sand with no horizon development. The pH ranges from 6.6 to 6.7.
Landcover class: Freshwater Marsh *Arctophila fulva* Class
Vegetation: *Arctophila fulva* dominates the Plant Association, and no co-dominants were observed. *Arctophila fulva* height reaches 0.7 m, however, it is often prostrate and < 0.2 m in height. Some other species recorded include *Caltha palustris*, *Ranunculus pallasii* and *Hippuris vulgaris*. Moss and lichens are generally absent.

FRESHWATER MARSH *ARCTOPHILA FULVA* PLANT ASSOCIATION

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Forb		
Caltha palustris	0	13
Chrysosplenium tetrandrum	0	13
Cochlearia officinalis	0	13
Epilobium palustre	0	13
Hippuris montana	0	13
Hippuris vulgaris	1	38
Ranunculus pallasii	0	13
Rumex aquaticus var. *fenestratus*	0	13
Saxifraga cernua	0	13
Graminoid		
Arctophila fulva	43	100
Moss		
Aulacomnium palustre	6	13

Freshwater Marsh *Carex aquatilis* Plant Association

***Carex aquatilis* Plant Association**
Water sedge Plant Association

Plots sampled: 3
Rank: G5; S5

Carex aquatilis Plant Association near Point Hope, Alaska.

Other studies: Well described in the literature.
Distribution: Common on the Coastal Plain, less common in the Brooks Range Foothills and rare in the Brooks Range.
Patch size: Small to large
Elevation: Sea level to moderate elevations in mountains
Slope: 0 to 5°
Landform: Occurs on edges of thaw lakes, other lakes, centers of low-center polygons, troughs of high-center polygons, water tracks, beaded streams and valley bottom drainage areas.
Hydrology: Wet, with shallow (0-10 cm) standing or flowing water. Water depth varies depending on flooding and precipitation.
Soil: Organic horizon or roots over silt or sand. Permafrost depth ranges from 20 to 24+ cm. The pH was 6.3.
Landcover class: Freshwater Marsh *Carex aquatilis* Class
Vegetation: *Carex aquatilis* dominates. Species diversity is low. Additional species may include *Betula nana*, *Salix pulchra, Salix reticulata*, *Caltha palustris*, and *Pedicularis sudetica*. Moss and lichen cover are generally low.

FRESHWATER MARSH *CAREX AQUATILIS* PLANT ASSOCIATION

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	7	33
Dryas octopetala	2	33
Salix arctica	0	33
Salix pulchra	2	33
Salix reticulata	2	33
Forb		
Caltha palustris	0	33
Draba alpina	0	33
Pedicularis lapponica	0	33
Petasites frigidus	0	33
Graminoid		
Carex aquatilis	90	100
Eriophorum angustifolium	1	33
Moss		
Moss	3	67
Sphagnum	3	33

Wet Sedge Plant Associations

***Carex aquatilis-Eriophorum angustifolium* Plant Association**
Water sedge-Tall cottongrass Plant Association

Plots sampled: 16
Rank: G5; S5

Carex aquatilis-Eriophorum angustifolium Plant Association near Utqiaġvik, Alaska.

Other studies: Similar to the *Carex aquatilis* (Churchill 1955, MacKenzie et al. 2014 [in prep]), *Carex aquatilis-Saxifraga cernua* (Webber 1978), and *Carex aquatilis-Eriophorum angustifolium* subtype *Carex chordorrhiza* (Walker and Barry 1991) associations, and numerous other studies.
Distribution: Common on the Coastal Plain, less common in the Brooks Range Foothills and rare in the Brooks Range.
Patch size: Small to large
Elevation: 1 to 729 m
Slope: 0 to 8°
Landform: Occurs on marsh edges and wet edges of thaw lakes, other lakes, centers of low-center polygons, troughs of high-center polygons, water tracks, patterned fens, beaded streams and valley bottom drainage areas. It even occurs on dune slacks.
Hydrology: Wet, sometimes with seasonal shallow (0-10 cm) standing or flowing water. Water depth varies depending on flooding and precipitation.
Soil: Organic horizon or roots over silt or sand. Top soil horizon is sometimes muck or mineral soil. Permafrost depth ranges from 20 to 44+ cm. The pH ranges from 5.4 to 7.1.
Landcover class: Wet Sedge Class
Vegetation: *Carex aquatilis* dominates or co-dominates with *Eriophorum angustifolium*. Species diversity varies from nearly pure *Carex aquatilis* to sites with a variety of low and prostrate shrubs, graminoids and forbs. These include *Betula nana, Salix pulchra, Salix reticulata, Caltha palustris, Equisetum arvense,* and *Pedicularis sudetica*. Moss and lichen cover are generally low.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	0	6
Dryas octopetala	0	6
Salix arctica	0	6
Salix fuscescens	0	6
Salix ovalifolia	0	6
Salix polaris	1	6
Salix pulchra	1	19
Salix reticulata	0	13
Salix rotundifolia	0	6
Forb		
Aconitum delphiniifolium	0	6
Caltha palustris	1	13
Caltha palustris var. *radicans*	0	13
Cardamine pratensis	0	13
Comarum palustre	0	19
Equisetum arvense	1	31
Geum glaciale	0	6
Hippuris vulgaris	0	6
Pedicularis parviflora ssp. *pennellii*	0	6
Pedicularis sudetica ssp. *albolabiata*	0	13
Petasites frigidus	0	19
Petasites frigidus var. *frigidus*	0	6
Polygonum viviparum	0	6
Ranunculus nivalis	0	19
Ranunculus pallasii	0	6
Ranunculus trichophyllus	1	6
Rumex arcticus	0	6
Saxifraga cernua	0	19
Saxifraga foliolosa	0	13
Saxifraga hieraciifolia	0	13
Saxifraga hirculus	0	19
Saxifraga nelsoniana	0	6
Stellaria longifolia	0	6
Stellaria longipes	0	6
Thalictrum alpinum	0	6
Graminoid		
Arctagrostis latifolia	0	13
Arctophila fulva	0	6
Calamagrostis canadensis	0	6
Calamagrostis stricta ssp. *stricta*	0	6
Carex aquatilis	58	100
Carex glareosa	1	6
Carex membranacea	0	6
Carex rariflora var. *rariflora*	2	6
Carex rotundata	0	19
Carex saxatilis	2	6
Dupontia fisheri	0	13
Eriophorum angustifolium	6	50
Eriophorum chamissonis	1	6
Eriophorum russeolum	1	13
Eriophorum scheuchzeri	1	13
Eriophorum vaginatum	3	25
Juncus castaneus	0	6
Luzula arctica	1	6
Poa arctica ssp. *arctica*	1	19
Poa pratensis	1	6
Lichen		
Alectoria nigricans	0	6
Cetraria islandica	0	6
Cladina rangiferina	0	6
Cladonia cornuta	0	6
Dactylina arctica	0	13
Flavocetraria cucullata	0	6
Flavocetraria nivalis	0	6
Lichen, crustose	0	6
Sphaerophorus globosus	0	6
Thamnolia vermicularis	0	13
Moss		
Aulacomnium	0	6
Dicranum elongatum	0	6
Meesia triquetra	1	6
Moss	3	19
Polytrichum hyperboreum	0	6
Sphagnum	1	25
Sphagnum balticum	0	6
Sphagnum squarrosum	0	6

***Carex aquatilis-Eriophorum* spp./*Sphagnum* spp. Plant Association**
Water sedge-Cottongrass spp./Peat moss spp. Plant Association

Plots sampled: 3
Rank: G4; S4

Carex aquatilis-Eriophorum spp./*Sphagnum* spp. Plant Association near Point Hope, Alaska.

Other studies: Similar to the *Carex aquatilis-Eriophorum angustifolium/Sphagnum* spp. (Johnson et al. 1966), *Carex aquatilis-Eriophorum angustifolium* subtype *Sphagnum* sp. (Young 1971), *Carex aquatilis-Eriophorum angustifolium* subtype *Drepanocladus brevifolius* (Walker 1985), and *Carex aquatilis/Sphagnum* spp. (Boggs et al. 1999) associations.
Distribution: This association occurs primarily near Point Hope and on the Coastal Plain. It is more common on the Yukon-Kuskokwim Delta and the northern Seward peninsula-Selawik lowlands ecoregions (Nowacki et al. 2001) on flat permafrost plateaus and raised bogs.
Patch size: Small
Elevation: 1 to 358 m
Slope: 0 to 1°
Landform: Occurs on low-centered polygons, wet depressions and beaded streams. On the Yukon-Kuskokwim Delta and the northern Seward peninsula-Selawik lowlands ecoregions (Nowacki et al. 2001) it is common on flat permafrost plateaus and raised bogs.
Hydrology: Wet, often with shallow (0 to 10 cm) standing or flowing water. Water depth varies depending on flooding and precipitation.
Soil: On the North Slope, soils are poorly drained and acidic (pH ranges from 4.8 to 5.2), typically with a well-developed peat layer. Permafrost is present.
Landcover class: Wet Sedge-*Sphagnum* Class
Vegetation: *Sphagnum* cover is > 25% (often continuous) and herbaceous species (primarily sedges) cover is > 25%. *Carex aquatilis* is typically the dominant sedge, although *Eriophorum angustifolium* and *Eriophorum chamissonis* may co-dominate. *Sphagnum* spp. may include *Sphagnum tundra* and *S. fimbriatum.* Common dwarf shrubs (< 0.2 m tall) include *Salix pulchra* and *Salix fuscescens.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	0	33
Betula nana	0	33
Cassiope tetragona	0	33
Salix fuscescens	2	33
Salix ovalifolia	0	33
Salix pulchra	5	33
Graminoid		
Carex aquatilis	52	100
Carex rotundata	3	33
Eriophorum angustifolium	12	67
Eriophorum chamissonis	3	33
Eriophorum russeolum	2	33
Lichen		
Thamnolia vermicularis	0	33
Moss		
Aulacomnium turgidum	2	33
Polytrichum juniperinum	2	33
Sphagnum	40	67
Sphagnum fimbriatum	17	33
Sphagnum tundrae	10	33

***Carex rotundata-Eriophorum angustifolium* Plant Association**
Round sedge-Tall cottongrass Plant Association

Plots sampled: 3
Rank: GNR; SNR

Carex rotundata-Eriophorum angustifolium Plant Association on melting thermokarst/polygonal ground south of Deadhorse, Alaska.

Other studies: Similar to the *Carex rotundata* (Brock and Burke 1980) and *Carex rotundata-Sphagnum orientale* (Walker and Walker 1996) associations.
Distribution: Brooks Range Foothills and Coastal Plain. Uncommon.
Environment: These are wet, level to low angle sites with standing water. Includes low centered polygons, patterned fens, and thermokarst. Elevation ranges from 487 to 519 m. The soils have a 20 cm+ organic horizon and the pH is neutral.
Landcover class: Wet Sedge
Vegetation: *Carex rotundata* dominates or co-dominates with *Eriophorum angustifolium*. Other common herbaceous species include *Polygonum viviparum, Carex aquatilis, Carex capillaris* and *Eriophorum scheuchzeri*. Common shrubs include *Andromeda polifolia, Betula nana, Salix fuscescens* and *Vaccinium uliginosum.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	4	67
Betula nana	4	100
Dasiphora fruticosa ssp. *floribuna*	0	33
Dryas integrifolia	0	67
Rhododendron tomentosum	2	33
Salix fuscescens	5	100
Vaccinium uliginosum	3	67
Vaccinium vitis-idaea	0	33
Forb		
Pedicularis sudetica	0	33
Polygonum viviparum	0	67
Thalictrum alpinum	0	33
Tofieldia	0	33
Graminoid		
Carex aquatilis	7	33
Carex capillaris	3	33
Carex chordorrhiza	2	33
Carex limosa	2	33
Carex misandra	2	33
Carex rariflora	0	33
Carex rotundata	30	100
Carex saxatilis	10	67
Carex vaginata	5	33
Carex williamsii	0	33
Eriophorum angustifolium	35	100
Eriophorum chamissonis	3	33
Eriophorum scheuchzeri	7	33
Juncus triglumis	0	67
Lichen		
Dactylina arctica	1	33
Flavocetraria cucullata	3	33
Thamnolia vermicularis	1	33
Moss		
Aulacomnium turgidum	1	33
Fissidens adianthoides	2	33
Hylocomium splendens	7	67
Rhytidium rugosum	10	33
Sphagnum rubellum	1	33
Tomentypnum nitens	0	33

***Carex saxatilis-Eriophorum angustifolium* Plant Association**
Rock sedge-Tall cottongrass Plant Association

Plots sampled: 2
Rank: GNR; SNR

Carex saxatilis-Eriophorum angustifolium Plant Association on the Arctic Coastal Plain, Alaska.

Other studies: Similar to the *Carex saxatilis* association (Boggs et al. 1999).
Distribution: Brooks Range Foothills and Coastal Plain. Uncommon.
Environment: These are wet, level sites such as low-center polygons often with standing water. Soils have a thick organic horizon or root mat and permafrost is present.
Landcover class: Wet Sedge
Vegetation: *Carex saxatilis* dominates. Other common species may include *Eriophorum angustifolium* and *Eriophorum vaginatum.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	0	50
Dasiphora fruticosa	1	50
Salix fuscescens	0	50
Salix hastata	0	50
Salix pulchra	1	50
Forb		
Cerastium	1	50
Comarum palustre	1	50
Equisetum variegatum	0	50
Pedicularis parviflora	0	50
Saxifraga cernua	0	50
Valeriana capitata	0	50
Graminoid		
Calamagrostis stricta	5	50
Carex saxatilis	75	100
Eriophorum angustifolium	16	100
Eriophorum vaginatum	15	50
Moss		
Catoscopium nigritum	8	50
Drepanocladus brevifolius	10	50
Moss	3	50
Scorpidium	8	50

***Eriophorum angustifolium-Carex* spp. Plant Association**
Tall cottongrass-Sedge species Plant Association

Plots sampled: 12
Rank: G5; S5

Eriophorum angustifolium-Carex spp. Plant Association in a water track in the central Brooks Range Foothills, Alaska.

Other studies: Similar to the *Eriophorum angustifolium-Carex aquatilis* subtype *Dupontia fisheri* (Webber 1978), *Eriophorum angustifolium* (Murray 1974), *Carex aquatilis-Eriophorum angustifolium* subtype *Carex chordorrhiza* (Walker and Barry 1991), *Eriophorum angustifolium* ssp. *subarcticum* (Boggs et al. 1999) and *Vaccinium uliginosum-Eriophorum angustifolium-Carex aquatilis* (MacKenzie et al. 2014 [in prep]) associations.
Distribution: Common on the Coastal Plain, less common in the Brooks Range Foothills and rare in the Brooks Range.
Patch size: Small to large
Elevation: 5 to 900 m
Slope: 0 to 2°
Landform: Occurs on the marsh edges and wet edges of thaw lakes, other lakes, centers of low-center polygons, wet troughs of high-center polygons, water tracks, patterned fens and valley bottom drainage areas.
Hydrology: Wet, typically with shallow (0 to 20 cm) standing water. Water depth varies depending on flooding and precipitation.
Soil: Standing or flowing water over organic horizon or roots, then silt or sand. Permafrost depth ranges from 16 to 55 cm. The pH ranges from 4.7 to 7.2

Landcover class: Wet Sedge
Vegetation: *Eriophorum angustifolium* dominates the sites, often with high canopy cover of *Carex aquatilis, Carex saxatilis, Eriophorum chamissonis*, or *Eriophorum russeolum*. Shrubs have low cover values and include *Betula nana, Salix reticulata,* and *Salix pulchra.* Moss and lichen cover are generally low. The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Andromeda polifolia	0	8
Betula nana	0	25
Dryas integrifolia	0	17
Dryas octopetala	0	8
Rhododendron lapponicum	0	8
Salix arctica	0	8
Salix fuscescens	1	17
Salix polaris	0	8
Salix pulchra	2	58
Salix reticulata	1	25
Salix richardsonii	0	8
Salix stolonifera	0	8
Vaccinium uliginosum	0	8
Forb		
Caltha palustris	0	8
Comarum palustre	0	8
Equisetum fluviatile	1	8
Pedicularis sudetica	0	8
Polygonum viviparum	0	8
Pyrola asarifolia	0	8
Saxifraga cernua	0	8
Saxifraga foliolosa	0	8
Saxifraga hieraciifolia	0	8
Stellaria	0	8
Tofieldia	0	8
Graminoid		
Arctagrostis latifolia	0	8
Carex aquatilis	6	42
Carex atrofusca	0	8
Carex chordorrhiza	2	17
Carex limosa	0	8
Carex podocarpa	1	8
Carex rostrata	0	8
Carex rotundata	1	17
Carex saxatilis	3	17
Eriophorum angustifolium	57	100
Eriophorum chamissonis	2	8
Eriophorum russeolum	4	17
Eriophorum vaginatum	2	8
Luzula confusa	0	8
Lichen		
Dactylina arctica	0	8
Flavocetraria cucullata	0	8
Moss		
Aulacomnium turgidum	0	17
Calliergon giganteum	4	8
Dicranum	0	8
Drepanocladus	0	8
Hylocomium splendens	0	8
Mnium	0	8
Moss	2	25
Plagiomnium	0	8
Pohlia	0	8
Polytrichum	0	8
Rhytidiadelphus squarrosus	0	8
Sphagnum	0	17
Tomentypnum nitens	0	8

***Eriophorum chamissonis-Eriophorum angustifolium* Plant Association**
Russet cottongrass-Tall cottongrass Plant Association

Plots sampled: 1
Rank: GNR; SNR

Eriophorum chamissonis-Eriophorum angustifolium Plant Association near Galbraith Lake in the central Brooks Range, Alaska.

Other studies: Similar to the *Eriophorum chamissonis-Carex aquatilis-Sphagnum* (MacKenzie et al. 2014 [in prep]) association.
Distribution: Brooks Range Foothills and valleys of Brooks Range. Uncommon.
Environment: These are wet, level sites often with standing water.
Landcover class: Wet Sedge
Vegetation: *Eriophorum chamissonis* dominates or co-dominates with *Eriophorum angustifolium*. *Carex aquatilis* may be common.

***Trichophorum cespitosum-Carex rotundata* Plant Association**
Tufted bulrush-Round sedge Plant Association

Plots sampled: 1
Rank: G5; S5

Trichophorum cespitosum-Carex rotundata Plant Association in the Brooks Range foothills near Chandler River.

Other studies: Similar to the *Trichophorum caespitosum-Triglochin palustris* (Webber et al. 1978), and *Trichophorum cespitosum-Carex aquatilis-Scorpidium* (de Groot et al. 2014 [in prep]) associations.
Distribution: Coastal plain and Brooks Range Foothills. Uncommon.
Environment: These are wet, level to low angle sites. Soils have a thick (30 cm) organic horizon.
Landcover class: Wet sedge
Vegetation: *Trichophorum cespitos*um dominates the sites. Other common herbaceous species include *Carex rotundata* and *Carex rariflora*. Shrubs may include *Andromeda polifolia* and *Salix fuscescens*. Mosses are common including *Tomentypnum nitens*.

Mesic Herbaceous Plant Associations

***Carex microchaeta-Scorpidium* spp. Plant Association**
Smallawned sedge-Scorpidium moss spp. Plant Association

Plots sampled: 1
Rank: GNR; SNR

Carex microchaeta-Scorpidium spp. Plant Association in the Delong Mountains of the western Brooks Range, Alaska.

Other studies: Similar to the *Carex microchaeta-Poa arctica* (Batten 1977) association.
Distribution: Brooks Range and Brooks Range Foothills. Uncommon.
Environment: This association occurs on mesic to sometimes wet alpine slopes. The soil is a thin organic horizon over a C horizon.
Landcover class: Mesic Herbaceous
Vegetation: *Carex microchaeta* dominates. Other common species may include the dwarf shrubs *Dryas octopetala* and *Salix reticulate* and total dwarf shrub cover is less than 20%. Herbaceous species include *Carex membranacea, Equisetum arvense* and *Eriophorum angustifolium*. Mosses may be common including *Scorpidium* spp. and *Tomentypnum nitens*.

***Equisetum variegatum-Equisetum arvense* Plant Association**
Variegated horsetail-Field horsetail Plant Association

Plots sampled: 3
Rank: G5; S5

Equisetum variegatum-Equisetum arvense Plant Association on a river channel of the Colville River, Alaska.

Other studies: Similar to the *Equisetum variegatum* (Young 1974) association.
Distribution: Active and inactive floodplains on the Coastal Plain. Uncommon.
Environment: This association occurs on wet silt-sand floodplain channels.
Landcover class: Mesic Herbaceous
Vegetation: *Equisetum variegatum* dominates or co-dominates the site with *Equisetum arvense.* Moss cover may be high including *Distichium capillaceum* and *Drepanocladus* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Dryas integrifolia	2	33
Salix hastata	0	33
Salix reticulata	1	33
Forb		
Equisetum arvense	15	67
Equisetum variegatum	57	100
Parnassia palustris	0	33
Pedicularis sudetica	0	33
Polygonum viviparum	0	33
Graminoid		
Carex aquatilis	1	33
Carex aurea	1	33
Carex membranacea	0	33
Elymus alaskanus ssp. *alaskanus*	1	33
Eriophorum angustifolium	1	33
Poa arctica	0	33
Poa palustris	0	33
Moss		
Aulacomnium palustre	1	33
Aulacomnium turgidum	1	33
Bryum	0	33
Calliergon giganteum	1	33
Distichium capillaceum	6	33
Drepanocladus	31	67
Hylocomium splendens	0	33
Moss	8	33
Tomentypnum nitens	2	33

***Poa arctica-Calamagrostis stricta* spp. *inexpansa* Plant Association**
Arctic bluegrass-Northern reedgrass Plant Association

Plots sampled: 2
Rank: GNR; SNR

Poa arctica-Calamagrostis stricta spp. *inexpansa* Plant Association on an ocean bluff near Utqiaġvik, Alaska.

Other studies: Similar to the *Luzula confusa-Poa arctica* association (Webber 1978).
Distribution: Coastal plain. Uncommon.
Environment: Occurs on organic-rich flat-top or high-center polygons, often on the coastline. The soil is a thick organic horizon (10 to 44 cm). Sites are mesic although the water table may be near the ground surface. Permafrost occurs.
Landcover class: Mesic Herbaceous
Vegetation: *Poa arctic* dominates or co-dominates. Common herbaceous species may include *Anthoxanthum monticola* ssp. *alpinum, Arctagrostis latifolia* ssp. *latifolia, Calamagrostis stricta* ssp. *inexpansa, Carex aquatilis* and *Eriophorum angustifolium*. Common shrubs include *Salix pulchra* and *Vaccinium vitis-idaea*, and common mosses include *Aulacomnium palustre* and *Polytrichum hyperboreum*.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Betula nana	1	50
Rhododendron tomentosum	1	50
Salix fuscescens	5	100
Salix glauca	1	50
Salix pulchra	6	100
Vaccinium vitis-idaea	10	50
Forb		
Chrysosplenium tetrandrum	0	50
Erigeron pallens	0	50
Petasites frigidus	1	100
Polemonium acutiflorum	0	50
Rubus chamaemorus	0	50
Rumex aquaticus var. *fenestratus*	0	50
Saxifraga cernua	0	50
Saxifraga nelsoniana ssp. *nelsoniana*	0	50
Stellaria longifolia var. *longifolia*	1	50
Valeriana capitata	0	50
Graminoid		
Anthoxanthum monticola ssp. *alpinum*	5	50
Arctagrostis latifolia ssp. *latifolia*	3	50
Calamagrostis stricta ssp. *inexpansa*	10	50
Carex aquatilis	3	50
Carex lugens	1	50
Eriophorum angustifolium	3	50
Eriophorum chamissonis	1	50
Luzula confusa	3	50
Poa arctica	28	100
Lichen		
Cladina	0	50
Cladonia	0	50
Dactylina arctica	0	50
Flavocetraria cucullata	0	50
Lichen, crustose	3	50
Sphaerophorus globosus	1	50
Thamnolia vermicularis	1	50
Moss		
Aulacomnium palustre	2	50
Ceratodon purpureus	0	50
Moss	1	50
Polytrichum	2	50
Polytrichum hyperboreum	2	50

***Rubus chamaemorus-Polytrichum* spp. Plant Association (provisional)**
Cloudberry-Polytrichum moss spp. Plant Association

Plots sampled: 1
Rank: GNR; SNR

Rubus chamaemorus-Polytrichum spp. Plant Association (provisional) in the Brooks Range foothills near the Dalton Highway.

Other studies: Not previously described.
Distribution: Brooks Range Foothills. Uncommon.
Environment: Occurs on low angle slopes in foothills. The soil has a thick organic horizon (35 cm), sites are wet and permafrost occurs. The one pH is 5.2.
Landcover class: Mesic Herbaceous
Vegetation: *Rubus chamaemorus* dominates or co-dominates. Common herbaceous species may include *Carex lugens, Petasites frigidus* and *Poa arctica.* Common shrubs include *Rhododendron tomentosum, Salix fuscescens* and *Salix pulchra.* Moss cover is high and includes *Hylocomium splendens, Polytrichum* spp. and *Sphagnum squarrosum.*

Coastal Marsh Plant Associations

***Carex glareosa* Plant Association**
Lesser saltmarsh sedge Plant Association

Plots sampled: 2
Rank: G3; S3

Carex glareosa Plant Association on subsiding polygonal ground near Utqiaġvik, Alaska.

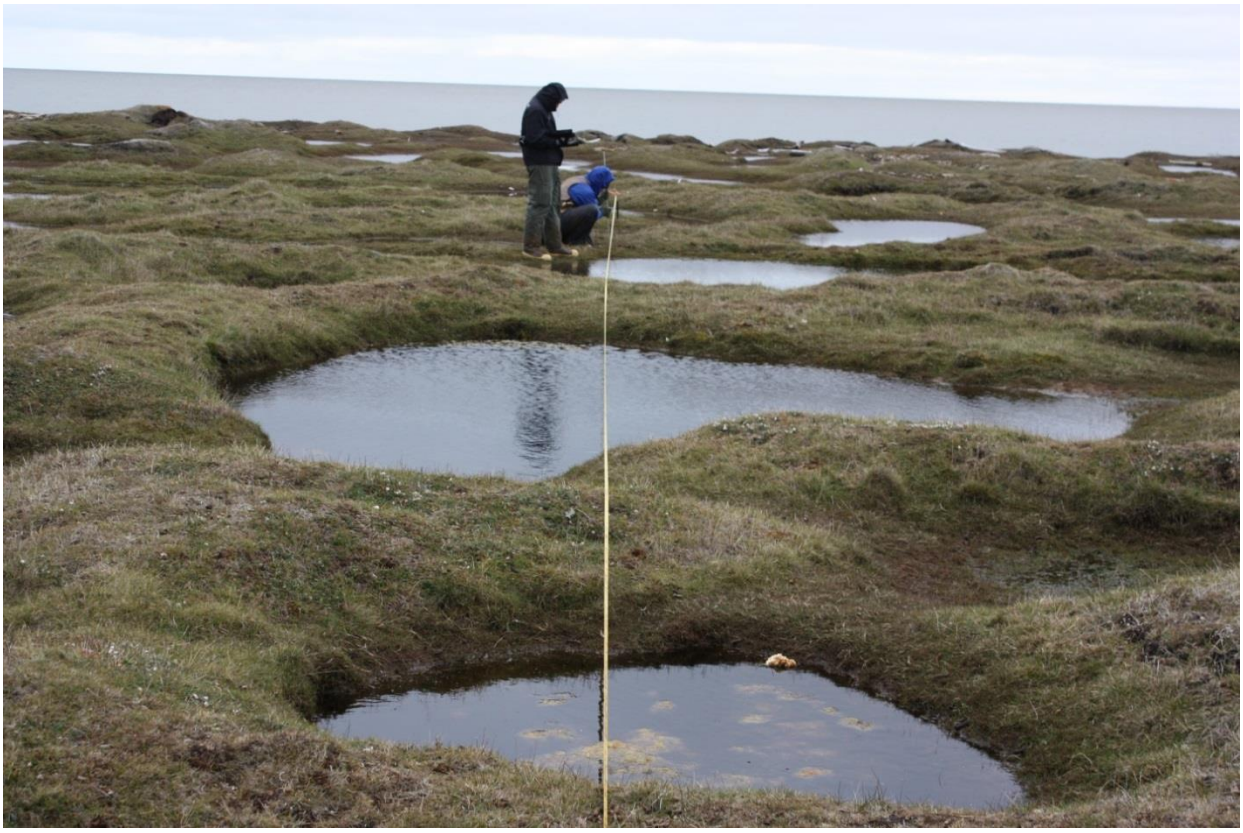
Other studies: Not previously described in the Arctic.
Distribution: Common in Arctic Ocean tidal marshes.
Patch size: Small
Elevation: Intertidal
Slope: 0 to 5°
Landform: Tidal marshes may occur wherever there is relatively flat land at sea level with periodic input of tidal waters (Frohne 1953). Arctic tidal marshes form primarily as a narrow fringe (< 30 m wide) along the coastline, tidal river channels, tidal lagoons protected by barrier islands and also on salt-killed tundra. The *Carex glareosa* association typically occurs in the upper tidal zone within these marshes, on sub-siding tundra or on newly deposited sand from shifting beaches and coastal dunes.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.
Soil: Soils are variable. One site is pure sand, and the subsiding-tundra site is organic horizon layered with sand. Permafrost not reached at 40 cm depth, and the pH ranges from 5.3 to 6.5.
Landcover class: Coastal Marsh
Vegetation: *Carex glareosa* dominates or co-dominates with *Dupontia fisheri* and *Stellaria humifusa*. Other tidal species include *Puccinellia phryganodes.* On sub-siding tundra sites, non-tidal species (e.g. tundra species) may be common including *Poa arctica, Taraxacum officinale* ssp. *ceratophorum,* and *Chrysanthemum arcticum.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix fuscescens	3	50
Forb		
Chrysanthemum arcticum	3	50
Cochlearia officinalis	0	50
Stellaria humifusa	5	50
Taraxacum officinale ssp. *ceratophorum*	0	50
Graminoid		
Arctophila fulva	0	50
Carex glareosa	50	100
Dupontia fisheri	5	50
Eriophorum angustifolium	1	50
Poa arctica ssp. *arctica*	2	50
Puccinellia phryganodes	3	50
Moss		
Campylium stellatum	0	50
Pohlia	0	50

***Carex subspathacea* Plant Association**
Hoppner's sedge Plant Association

Plots sampled: 4
Rank: G3; S3



Carex subspathacea Plant Association east of Utqiaġvik, Alaska. *Carex subspathacea* is invading polygonal ground.

Other studies: Similar to the *Carex subspathacea* (Hanson 1951, Hanson 1953, Meyers 1985), and *Carex subspathacea* (MacKenzie et al. 2014 [in prep]) associations.
Distribution: Common in Arctic Ocean tidal marshes.
Patch size: Small
Elevation: Intertidal
Slope: 0 to 1°
Landform: Tidal marshes may occur wherever there is relatively flat land at sea level with periodic input of tidal waters (Frohne 1953). Arctic tidal marshes form primarily as a narrow fringe (< 30 m wide) along the coastline, tidal river channels, tidal lagoons protected by barrier islands and also on salt-killed tundra. The *Carex subspathacea* association typically occurs in the upper tidal zone within these marshes on subsiding tundra or on newly deposited sand from shifting beaches and coastal dunes.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.
Soil: Soils are variable. Some are nearly pure sand overtopping a buried organic horizon. Other sites develop on subsiding-tundra with a thick (28 cm) organic horizon or roots horizon over silt or sand. Permafrost is present, and the pH ranges from 6.2 to 7.5.
Landcover class: Coastal Marsh
Vegetation: *Carex subspathacea* typically forms a dense turf. Other tidal species include *Carex ursina,*

Dupontia fisheri, Stellaria humifusa and *Puccinellia phryganodes.* On sub-siding tundra sites, non-tidal species (e.g. tundra species) may be common including *Eriophorum angustifolium* and bryophytes such as *Campylium stellatum* and *Meesia triquetra*.

These sites are typically heavily grazed by birds.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix ovalifolia	0	25
Forb		
Cochlearia officinalis	0	25
Honckenya peploides ssp. *peploides*	0	25
Stellaria crassifolia	0	25
Stellaria humifusa	3	25
Graminoid		
Calamagrostis deschampsioides	0	25
Carex unknown	9	25
Carex aquatilis	10	25
Carex subspathacea	50	75
Carex ursina	0	25
Dupontia fisheri	2	100
Eriophorum angustifolium	3	50
Eriophorum chamissonis	3	25
Poa unknown	0	25
Puccinellia phryganodes	3	25
Puccinellia tenella	0	25
Moss		
Bryum spp.	0	25
Calliergon giganteum	0	25
Campylium stellatum	4	25
Limprichtia revolvens	3	25
Meesia triquetra	5	25
Mnium spp.	1	25
Moss	1	50
Tomentypnum nitens	0	25

***Carex subspathacea-Salix ovalifolia* Plant Association**
Hoppner's sedge-Oval-leaf willow Plant Association

Plots sampled: 2
Rank: G3; S3

Carex subspathacea-Salix ovalifolia Plant Association (foreground) on an upper tidal zone at Cape Lisburne, Alaska.

Other studies: Not previously described.
Distribution: Common in Arctic Ocean tidal marshes.
Patch size: Small
Elevation: Intertidal
Slope: 0 to 1°
Landform: Tidal marshes may occur wherever there is relatively flat land at sea level with periodic input of tidal waters (Frohne 1953). Arctic tidal marshes form primarily as a narrow fringe (< 30 m wide) along the coastline, tidal river channels, tidal lagoons protected by barrier islands and also on salt-killed tundra. The *Carex subspathacea-Salix ovalifolia* association typically occurs in the upper tidal zone within these marshes on sub-siding tundra, on the banks of tidal rivers or on newly deposited sand from shifting beaches and coastal dunes.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.

Soil: Soils are variable. Some are nearly pure silt or silt/sand/gravel. Other sites develop on subsiding-tundra with a thick (25 cm) organic horizon over silt or sand. Permafrost is likely present in all sites. The pH's are 6.4.
Landcover class: Coastal Marsh
Vegetation: Both *Salix ovalifolia* and *Carex subspathacea* have > 25% cover. Other tidal species include *Carex ursina, Dupontia fisheri, Cochlearia officinalis*, and *Stellaria humifusa.* On sub-siding tundra sites, non-tidal species (e.g. tundra species) may be common including *Carex aquatilis, Poa pratensis* ssp. *alpigena* and bryophytes such as *Bryum pseudotriquetrum, Campylium stellatum* and *Hylocomium splendens.*

These sites may be heavily grazed by birds.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix ovalifolia	43	100
Salix polaris	0	50
Forb		
Cerastium beeringianum	2	50
Chrysanthemum arcticum	0	50
Cochlearia officinalis	0	100
Pedicularis lanata	0	50
Potentilla nana	2	50
Primula borealis	0	50
Rumex arcticus	0	50
Saxifraga cernua	0	50
Saxifraga rivularis	0	50
Stellaria humifusa	2	50
Stellaria longipes ssp. *longipes*	0	50
Graminoid		
Carex aquatilis	40	50
Carex subspathacea	35	100
Carex ursina	15	50
Dupontia fisheri	0	50
Eriophorum angustifolium ssp. *triste*	0	50
Poa arctica	3	50
Poa pratensis ssp. *alpigena*	15	50
Lichen		
Alectoria ochroleuca	0	50
Thamnolia vermicularis	0	50
Moss		
Aulacomnium palustre	1	50
Bryum pseudotriquetrum	8	50
Campylium stellatum	1	50
Dichelyma capillaceum	3	50
Hylocomium splendens	3	50
Polytrichastrum alpinum	3	50
Sanionia uncinata	5	50

***Dupontia fisheri* Plant Association**
Fisher's tundragrass Plant Association

Plots sampled: 10
Rank: G3; S3

Dupontia fisheri Plant Association along the Beaufort Sea coast east of Utqiaġvik, Alaska.

Other studies: Similar to the *Dupontia fisheri-Eriophorum angustifolium-Carex aquatilis-Hierochloë pauciflora/Campylium stellatum* (Jorgenson et al. 1994), and *Dupontia fisheri-Carex aquatilis* (MacKenzie et al. 2014 [in prep]) associations.
Distribution: Common in Arctic Ocean tidal marshes.
Patch size: Small
Elevation: Intertidal
Slope: 0 to 1°
Landform: Tidal marshes may occur wherever there is relatively flat land at sea level with periodic input of tidal waters (Frohne 1953). Arctic tidal marshes form primarily as a narrow fringe (< 30 m wide) along the coastline, tidal river channels, tidal lagoons protected by barrier islands and also on salt-killed tundra. The *Dupontia fisheri* association typically occurs in the upper tidal zone within these marshes, on sub-siding tundra or on newly deposited sand from shifting beaches and coastal dunes.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.
Soil: Soils are variable. Some develop where sand is common such as on tidal river sloughs, or the lagoon side of barrier islands. These soils are sand/silt, sometimes overtopping a buried organic horizon. Other sites develop on subsiding-tundra with a thick (30 cm) organic horizon over silt or sand. Permafrost is likely always present. The pH ranges from 5.5 to 7.8.
Landcover class: Coastal Marsh
Vegetation: *Dupontia fisheri* dominates the sites or co-dominates with *Stellaria humifusa* or *Carex ursina.* Other species include *Salix ovalifolia* and *Calamagrostis deschampsioides.*
On sub-siding tundra sites, non-tidal species (e.g. tundra species) may be common including *Eriophorum angustifolium* and *Eriophorum scheuchzeri.*

Species	Cov %	Con %
Shrub		
Salix ovalifolia	4	50
Forb		
Astragalus alpinus	0	10
Cardamine bellidifolia	0	10
Cerastium beeringianum	0	10
Chamerion angustifolium	0	10
Cochlearia officinalis	0	20
Hippuris vulgaris	0	10
Petasites frigidus	0	20
Polemonium acutiflorum	0	10
Primula borealis	0	10
Saxifraga cernua	1	10
Saxifraga hirculus	0	10
Saxifraga nelsoniana	0	10
Stellaria crassifolia	0	20
Stellaria humifusa	4	20
Valeriana capitata	0	10
Graminoid		
Arctagrostis latifolia	0	10
Calamagrostis deschampsioides	0	20
Carex aquatilis	2	30
Carex marina	1	10
Carex misandra	0	10
Carex subspathacea	0	20
Carex ursina	3	10
Dupontia fisheri	38	100
Eriophorum angustifolium	5	40
Eriophorum russeolum	1	20
Eriophorum scheuchzeri	4	10
Eriophorum vaginatum	0	10
Poa arctica ssp. *arctica*	0	10
Lichen		
Lichen, crustose	6	10
Nephroma expallidum	1	10
Thamnolia vermicularis	0	10
Moss		
Bryum	4	40
Calliergon giganteum	5	10
Distichium capillaceum	4	10
Drepanocladus	0	10
Moss	2	20
Tomentypnum nitens	0	10

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

***Puccinellia phryganodes* Plant Association**
Creeping alkaligrass Plant Association

Plots sampled: 5
Rank: G3; S3

Puccinellia phryganodes Plant Association along the Beaufort Sea coast east of Utqiaġvik, Alaska.

Other studies: Similar to the *Puccinellia phryganodes* (Thomas 1951, MacKenzie et al. 2014 [in prep]) association and several other studies.
Distribution: Common in Arctic Ocean tidal marshes.
Patch size: Small
Elevation: Intertidal
Slope: 0 to 10°
Landform: Tidal marshes may occur wherever there is relatively flat land at sea level with periodic input of tidal waters (Frohne 1953). Arctic tidal marshes form primarily as a narrow fringe (< 30 m wide) along the coastline, tidal river channels, tidal lagoons protected by barrier islands and also on salt-killed tundra. The *Puccinellia phryganodes* association typically occurs in the lower tidal zone within these marshes.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.
Soil: Soils are variable. Some are nearly pure sand with no horizon development. Other sites develop on subsiding-tundra with a thick (30 cm) organic horizon or roots horizon over silt or sand. Permafrost is present, and the pH ranges from 5.1 to 8.1.
Landcover class: Coastal Marsh
Vegetation: *Puccinellia phryganodes* may form a dense turf or merely scattered runners in more exposed sites. Species diversity is low and includes *Calamagrostis holmii, Sagina nivalis and Stellaria humifusa.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix ovalifolia	0	20
Forb		
Sagina nivalis	0	20
Stellaria humifusa	0	60
Graminoid		
Calamagrostis holmii	0	20
Carex	0	20
Carex ursina	0	20
Puccinellia	20	20
Puccinellia phryganodes	41	60
Puccinellia phryganodes ssp. *phryganodes*	19	20
Moss		
Dicranum groenlandicum	0	20
Polytrichastrum alpinum	1	20
Sarmenthypnum	2	20

Marine Beach/Beach Meadow Plant Associations

***Honckenya peploides* Plant Association**
Seaside sandplant Plant Association

Plots sampled: 3
Rank: G5; S5

Honckenya peploides Plant Association on a beach near Wainwright, Alaska.

Other studies: The same as the *Honckenya peploides* (Crow 1977, Batten et al. 1978, MacKenzie et al. 2014 [in prep]) association and several other studies.
Distribution: Circumpolar distribution on tidal beaches. Widely distributed but uncommon along Alaska's Arctic Ocean beaches.
Patch size: Linear, Small patch
Elevation: Intertidal
Slope: 0 to 5°
Landform: This association occurs on sandy beaches on the ocean side of barrier islands, below coastal bluffs, and other outer coastline locations. It typically occurs on the upper tidal zone exposed to wave action.
Hydrology: Intertidal and may be subject to twice daily tides or storm surge.

Soil: Sand with limited horizon development. Permafrost is not reached at 40 cm depth, and the pH ranges from 7.8 to 9.4.
Landcover class: Marine Beach/Beach Meadow
Vegetation: This association represents the first vegetation on sandy beaches. Vegetation composition is patchy with extensive bare patches. *Honckenya peploides* dominates. Other species may include *Leymus mollis* and *Mertensia maritima*. This association often grades into the *Leymus mollis* Plant Association. Mosses and lichens are absent.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Forb		
Honckenya peploides	9	100
Mertensia maritima	0	33
Graminoid		
Leymus mollis	2	33

***Leymus mollis* Plant Association**
Beach rye Plant Association

Plots sampled: 3
Rank: G5; S5

Leymus mollis Plant Association on a Chukchi Sea coast beach near Wainwright, Alaska.

Other studies: Similar to the *Leymus mollis* (Griggs 1936, Bank 1951, Hanson 1951, MacKenzie et al. 2014 [in prep]) association and several other studies.
Distribution: Widely distributed but uncommon along Alaska's Arctic Ocean beaches, beach dunes, and interior dunes.
Patch size: Linear, Small patch
Elevation: Supratidal beaches (0 to 7 m elevation)
Slope: 0 to 20°
Landform: This association occurs on sandy beaches and dunes on the ocean side of barrier islands, below coastal bluffs, and other outer coastline sites. It typically occurs above the upper tidal zone. These are typically active beaches and dunes with extensive bare soil. It also occurs on interior dunes, river dunes and delta dunes.
Hydrology: Dry to mesic. Sometimes flooded by storm surges.
Soil: Sand with limited horizon development. Permafrost is not reached at 40 cm depth, and the pH ranges from 6.8 to 7.8.
Landcover class: Marine Beach/Beach Meadow
Vegetation: *Leymus mollis* dominates. Other species may include *Honckenya peploides*, and *Lathyrus japonicus* var. *maritimus*. This association often grades into the *Honckenya peploides* Plant Association. Vegetation composition is patchy with extensive bare patches. Mosses and lichens are typically absent.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Forb		
Honckenya peploides	3	67
Lathyrus japonicus var. *maritimus*	0	33
Senecio pseudoarnica	0	33
Graminoid		
Leymus mollis	68	100
Poa arctica	0	33

***Leymus mollis-Lathyrus japonicus* var. *maritimus* Plant Association**
Beach rye-Beach pea Plant Association

Plots sampled: 1
Rank: G5; S5

Leymus mollis-Lathyrus japonicus var. *maritimus* Plant Association on a back beach near Point Hope, Alaska.

Other studies: Similar to the *Elymus mollis-Lathyrus maritimus* (Hanson 1951) association and several other studies.
Distribution: Rare along Alaska's Arctic Ocean coastline, and more common along Alaska's western coastline.
Landform: This association occurs as small patches on sandy beaches and dunes on the ocean side of barrier islands, below coastal bluffs, and other outer coastline sites. It typically occurs above the upper tidal zone. These are active beaches and dunes with extensive bare soil. Sites are dry to mesic and sometimes flooded by storm surges. The substrate is sand with little horizon development.
Hydrology: Dry to mesic. Sometimes flooded by storm surges.
Soil: Sand with limited horizon development. Permafrost is not reached at 40 cm depth.
Landcover class: Marine Beach/Beach Meadow
Vegetation: *Leymus mollis* co-dominates with *Lathyrus japonicus* var. *maritimus*. Other species may include *Honckenya peploides*, and *Festuca baffinensis*. This association grades into the *Leymus mollis* Plant Association. Moss cover is low.

Pingo Plant Associations

Pingos are dry, ice-cored hills found in the Arctic and are relatively common on the Coastal Plain. They are primarily dominated by *Dryas integrifolia*, but there are also grass-forb associations. On the most acidic sites, ericaceous heath is present. There are unique elements of the pingo vegetation found primarily on dry, south-facing slopes, habitats not found elsewhere on the Coastal Plain. These slopes have elements possibly related to the 'steppe tundras' that covered much of Alaska during the Pleistocene glaciations.

Due to the low number of plots (4) we sampled on pingos, we chose to use the stand types (i.e. Plant Associations) described by Walker (1987) on pingos in the central Coastal Plain. These associations are generally related to the following environmental drivers:

- North side of pingos and wind-exposed east-north-east slopes
- Summits and south slopes (warmer and drier sites)
- Late melting snowbeds on pingos
- Wetlands at the base of pingos

Small pingo near the Dalton Highway on the Coastal Plain.

Dryas integrifolia on pingo.

North side of pingos and wind-exposed east-north-east slopes support the following associations:

***Cerastium beeringianum-Minuartia rubella* (Pingo) Plant Association**
Bering chickweed-Beautiful sandwort (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos near the coast on alkaline soils.
on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Mean of 5°
Landform: North side of pingos and wind-exposed east-north-east slopes.
Hydrology: Dry to mesic
Soil: Mean pH 7.4. Pergelic Cryoborolls or Calcic Pergelic Cryoborolls
Landcover class: Mesic Herbaceous
Vegetation: Important species include *Cerastium beeringianum, Minuartia rubella, Melandrium affine,* and *Papaver lapponicum*. Lichens of less importance than on other north facing pingo associations.

Cerastium beeringianum-Minuartia rubella (Pingo) Plant Association on the Arctic Coastal Plain.

***Dryas integrifolia-Oxytropis nigrescens* (Pingo) Plant Association**
Entire-leaf mountain avens-Blackish oxytrope (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Mean of 11°
Landform: North side of pingos and wind-exposed east-north-east slopes. Cryoturbations common (estimated 10% of surface).
Hydrology: Dry to mesic
Soil: Well drained and deeply thawed. Mean pH 6.9. Calcic Pergelic Cryoboroll most common soil type.
Landcover class: Dwarf Shrub-Dryas
Vegetation: Species composition variable. *Dryas integrifolia* with mean 25% cover, and *Oxytropis nigrescens*, *Thamnolia subuliformis* and *Flavocetraria nivalis*are always present.

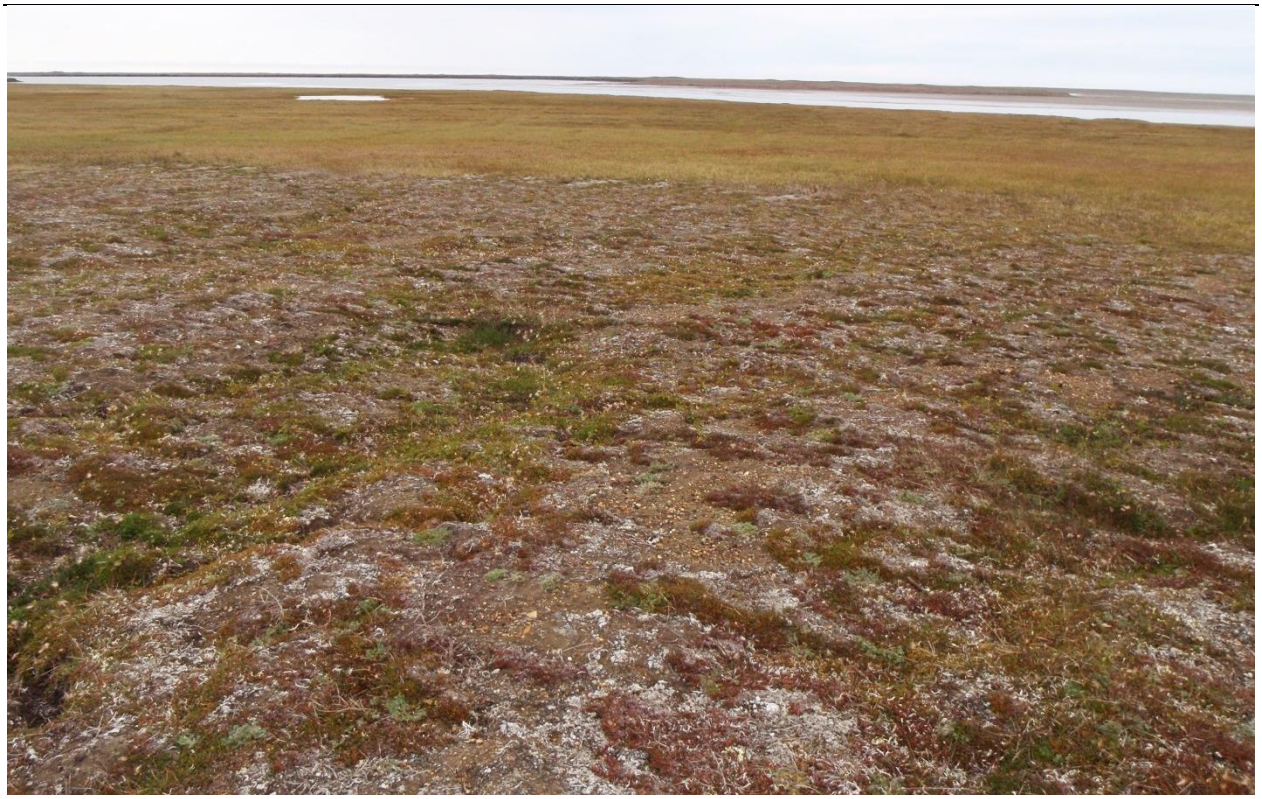
***Dryas integrifolia-Astragalus umbellatus* (Pingo) Plant Association**
Entire-leaf mountain avens-Tundra milkvetch (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Mean of 6°
Landform: North side of pingos and wind-exposed east-north-east slopes. More moist and less wind exposed than other north side pingo associations. Cryoturbations common (estimated 8% of surface).
Hydrology: Mesic
Soil: Mean pH of 6.7. Soils are varied.
Landcover class: Dwarf Shrub-Dryas
Vegetation: High *Dryas integrifolia* cover (15 to 50%), and *Astragalus umbellatus* a conspicuous sub-dominant. *Saxifraga oppositifolia, Papaver macounii, Parrya nudicaulis, Oxytropis campestris* var. *jordalii* and *Carex scirpoidea* common.

***Saxifraga bronchialis*-Lichen (Pingo) Plant Association**
Spotted saxifrage-Lichen (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Steep
Landform: North side of pingos and wind-exposed east-north-east slopes.
Hydrology: Dry to mesic
Soil: Gravelly acidic soils. Mean pH 5.2. Pergelic Cryochrepts or Pergelic Cryumbrepts.

Landcover class: Mesic Herbaceous
Vegetation: Lichens dominate the sites. Important species include *Psoroma hypnorum, Pertusaria dactylina, Luzula confusa, Salix phlebophylla*, and *Saxifraga tricuspidata*. *Dryas integrifolia* common in 2 of the 5 stands.

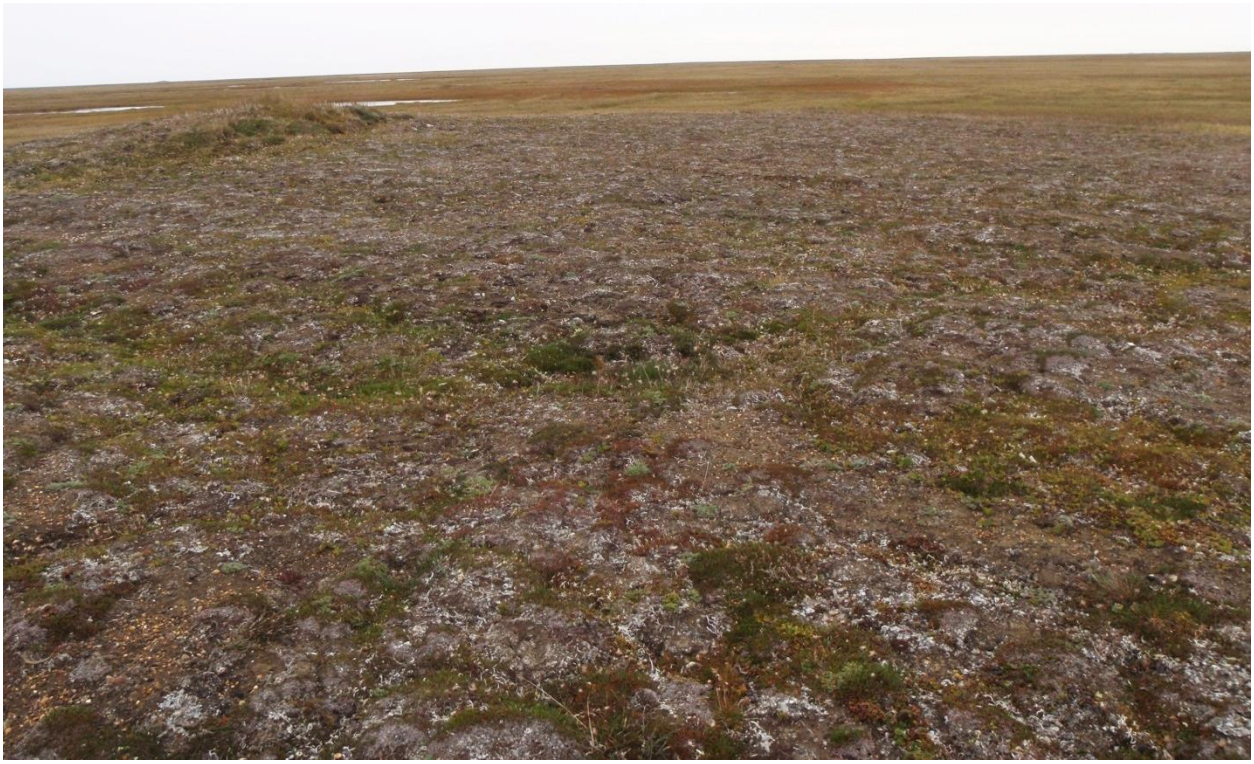


Saxifraga bronchialis-Lichen (Pingo) Plant Association east of Deadhorse, Alaska.

Pingo summits and south slopes (warmer and drier sites) support the following associations:

***Carex rupestris-Saxifraga oppositifolia* (Pingo) Plant Association**
Rock sedge-Purple saxifrage (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Flat to moderate
Landform: Summits and south slopes. Warmest and driest sites on pingos. Minimal animal disturbance. Little cryoturbation.
Hydrology: Dry to mesic
Soil: Mean pH 6.9. Soils primarily Pergelic Cryoborolls.
Landcover class: Mesic Herbaceous
Vegetation: *Carex rupestris* cover as high as 40%, and *Dryas integrifolia* ranging from 10 to 70%. Other species with high constancy are *Carex scirpoidea, Lecanora luteovernalis* and *Oxytropis campestris* var. *jordalii*. Ubiquitous cryptogams include *Cetraria cucullata, Cetraria nivalis, Lecanora epibryon,* and *Thamnolia subuliformis*.



Carex rupestris-Saxifraga oppositifolia (Pingo) Plant Association east of Deadhorse, Alaska.

***Cerastium beeringianum-Ranunculus pedatifidus* (Pingo) Plant Association**
Bering chickweed-Northern buttercup (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: 0 to 10°
Landform: Typically on flat pingo summits, but also on south slopes of pingos. Warmest and driest sites on pingos. Often have chronic disturbance by arctic ground squirrels, arctic fox and perching birds. The animal disturbed sites are deeply thawed and rich in nutrients. Cryoturbation is minimal. Human disturbance common (markers and radio towers) because these are the highest points on Coastal Plain.
Hydrology: Dry to mesic
Soil: Sandy soils. Soils are variable.
Landcover class: Mesic Herbaceous
Vegetation: Steppe type. Forbs and grasses dominate. Important species are *Cerastium beeringianum, Ranunculus pedatifidus, Papaver lapponicum* and *Draba cinerea* cover ranges from 0 to 50% with a mean of 11%. Ubiquitous cryptogams include *Cetraria cucullata, Cetraria nivalis, Lecanora epibryon,* and *Thamnolia subuliformis*. *Tortula ruralis* has high constancy.

***Poa glauca-Bromus pumpellianus* (Pingo) Plant Association**
Glaucous bluegrass-Brome (Pingo) Plant Association

Rank: G4; S4
Steppe tundra
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: 0 to 10°
Landform: Summits and south slopes. Warmest and driest sites on pingos. Often have chronic disturbance by arctic ground squirrels, arctic fox and perching birds. The animal disturbed sites are deeply thawed and rich in nutrients. No evidence of cryoturbation, but solifluction and animal disturbance common. These sites have the most evidence of arctic ground squirrel and bear disturbance.
Hydrology: Dry to mesic
Soil: Mean pH 6.3. Soils are variable.
Landcover class: Mesic Herbaceous
Vegetation: High cover of *Poa glauca* and *Bromus pumpellianus. Bupleurum triradiatum* has high constancy. Ubiquitous cryptogams include *Cetraria cucullata, Cetraria nivalis, Lecanora epibryon,* and *Thamnolia subuliformis*. *Dryas integrifolia* with minimal cover.

Late melting snowbeds on pingos support the following associations:

***Dryas integrifolia-Astragalus umbellatus-Carex rupestris* (Pingo) Plant Association**
Entire-leaf mountain avens-Tundra milkvetch-Rock sedge (Pingo) Plant Association

Rank: G4; S4

Dryas integrifolia-Astragalus umbellatus-Carex rupestris (Pingo) Plant Association. Photo by D. A. Walker.

Other studies: Derived from Walker (1987) stand type. Similar to the *Dryas integrifolia – Carex rupestris* (Walker 1985) association.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: 0 to 10°
Landform: Late melting snow beds on pingos.
Hydrology: Mesic
Soil: Mean pH 6.9. Soils mainly Pergelic Cryoborolls
Landcover class: Dwarf Shrub-Dryas
Vegetation: *Dryas integrifolia* cover ranges from 30 to 75% and *Astragalus umbellatus* 2 to 10%. *Cetraria* spp. common. Other species with high constancy are *Bryocaulon divergens, Hypogymnia subobscura,* and *Ochrolechia frigida*.

***Cassiope tetragona-Dryas integrifolia* (Pingo) Plant Association**
White arctic mountain heather-Entire-leaf mountain avens (Pingo) Plant Association

Rank: G4; S4

Cassiope tetragona-Dryas integrifolia (Pingo) Plant Association on Angel pingo, Prudhoe Bay, Alaska. Photo by D.A. Walker.

Other studies: Similar to the *Cassiope tetragona-Dryas integrifolia-Carex misandra* (MacKenzie et al. 2014 [in prep]) association and *Cassiope tetragona-Dryas integrifolia* subtype typical D Northern Alaska Snowbed, early-melting Nonacidic (Walker 1985). Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Mean of 12°
Landform: Late melting snow beds on pingos.
Hydrology: Mesic
Soil: Evenly spaces hummocks. Hummock is organic, and between hummocks is mineral.
Most common soil is Pergelic Cryoboroll.
Landcover class: Dwarf Shrub-Dryas
Vegetation: Highly variable floristics. *Cassiope tetragona* and *Dryas integrifolia* always present. Other differentiating species are *Hylocomium splendens, Peltigera aphthosa,* and *Minuartia arctica. Dryas integrifolia* on the hummocks, and *Cassiope tetragona* on both hummock and inter-hummock areas. Foliose lichens, mainly *Cetraria* spp. and *Dactylina arctica* are in inter-hummock sites.

***Salix rotundifolia-Dryas integrifolia* (Pingo) Plant Association**
Least willow-Entire-leaf mountain avens (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type. Similar to the *Salix rotundifolia-Sanionia uncinatus* subtype *Cardamine digitata* Walker (1985) association.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: 0 to 10°
Landform: Late melting snow beds on the leeward base of pingos. Under deep snow and poorly drained. No evidence of cryoturbation.
Hydrology: Wet.
Soil: Shallow thaw. Mean pH 6.5. Soils mainly Pergelic Cryaquolls.
Landcover class: Dwarf Shrub-Dryas
Vegetation: *Salix rotundifolia* dominates, up to 90% cover. Low species diversity. *Stereocaulon alpinum* may be a sub-dominant. *Arctagrostis latifolia* and *Carex lugens* common.

***Vaccinium uliginosum-Salix glauca* (subtype) (Pingo) Plant Association**
Bog blueberry-Grayleaf willow (Pingo) Plant Association

Rank: G4; S4
Other studies: Derived from Walker (1987) stand type.
Distribution: Found on pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: Mean 11°
Landform: Late melting snow beds on pingos.
Hydrology: Mesic
Soil: Mean pH 6.0. Most common soils are Pergelic Cryosaprist and Histic Pergelic Cryaquept.
Landcover class: Dwarf Shrub-other
Vegetation: *Vaccinium uliginosum* dominates. *Salix glauca* not dominant but usually present and < 20 cm tall. *Aulacomnium acuminatum* common.

Wetlands at the base of pingos support the following association:

***Phippsia algida-Saxifraga rivularis* (Pingo) Plant Association**
Icegrass-Weak saxifrage (Pingo) Plant Association

Rank: G4; S4
Other studies: Similar to the *Phippsia algida* (MacKenzie et al. 2014 [in prep]) association. Derived from Walker (1987) stand type.
Distribution: Found adjacent to pingos on the Coastal Plain
Patch size: Small
Elevation: Low elevation
Slope: 0°
Landform: Base of pingos. Wet sites with standing water and shallow thaw. Late melting snow beds.
Hydrology: Wet
Soil: Mean pH 5.4. Soils are Pergelic Cryosaprists.
Landcover class: Wet Sedge
Vegetation: *Phippsia algida* and *Saxifraga rivularis* dominate.

Sparsely Vegetated Plant Associations

***Cassiope tetragona* – *Anthoxanthum monticola* ssp. *alpinum* Sparse (Acidic) Plant Association**
White arctic mountain heather – Alpine sweet grass Sparse (Acidic) Plant Association

Plots sampled: 1
Rank: G4; S4

Cassiope tetragona – *Anthoxanthum monticola* ssp. *alpinum* Sparse (Acidic) Plant Association in the mountains on the Lisburne Peninsula, Alaska.

Other studies: Similar to the Alpine Acidic Barrens Ecotype (Jorgenson et al. 2009).
Distribution: Common throughout the Brooks Range and rounded hills in the Western Brooks Range and Foothills.
Patch size: Small to matrix forming
Elevation: > 300 m elevation
Slope: Flat to steep
Landform: Occurs on non-carbonate bedrock, hillside colluvium, and talus on mountain side-slopes, summits and rounded hills. Much of the rock surface has crustose lichens. This suggests that the surface layer of rocks is stable.
Hydrology: Dry to mesic
Soil: Soils are blocky or rubbly and surface organic horizons are very thin or completely lacking

(Jorgenson et al. 2009). Loess caps are absent. Soil pH is acidic to circumneutral. The dominant soils are Typic Gelorthents (poorly developed with permafrost below 1 m) and Typic Dystrogelepts (acidic, well drained, moderately thin organic horizon, permafrost below 1 m) (Jorgenson et al. 2009).
Landcover class: Sparsely Vegetated
Vegetation: Due to the low number of plots (1) we sampled in this type, we chose to use the species list from the Alpine Acidic Barrens ecotype from Jorgenson et al. (2009). Alpine Acidic Barrens is diverse in nonvascular plants, which can have up to 75% cover. Lichens are more common than mosses due to dry soils. Individual species cover is usually < 5%. Shrubs taller than 20 cm are absent. Common shrubs include *Cassiope tetragona, Rhododendron tomentosum, Kalmia procumbens, Vaccinium uliginosum* and *Vaccinium vitis –idaea.* Common herbaceous species include *Anemone narcissiflora, Huperzia selago, Anthoxanthum monticola* ssp. *alpinum. Carex microchaeta* and *Carex podocarpa*. Common moss species include *Chandonanthus* sp. and *Racomitrium* spp. Common lichens include *Cetraria* spp., *Cladina arbuscula, Cladina rangiferina, Cladonia* spp., *Dactylina* spp., *Flavocetraria cucullata, Flavocetraria nivalis,* and *Thamnolia* spp.

Talus slope supporting sparse vegetation in central Brooks Range, Alaska.

***Chamerion latifolium-Artemisia alaskana* Sparse (Floodplain) Plant Association**
Dwarf fireweed-Alaska wormwood Sparse (Floodplain) Plant Association

Plots sampled: 2
Rank: G5; S5

Chamerion latifolium-Artemisia alaskana Sparse (Floodplain) Plant Association on a cobble bar on the Colville River, Alaska.

Other studies: Similar to the *Epilobium latifolium-Artemisia tilesii* (Bliss and Cantlon 1957), *Chamerion latifolium-Artemisia arctica* (Walker 1985, Schickhoff et al. 2002) and *Epilobium latifolium-Salix arctica* (MacKenzie et al. 2014 [in prep]) associations and numerous other studies.
Distribution: Active floodplains in Brooks Range, Brooks Range Foothills and Coastal Plain. Common.
Environment: On floodplains it occurs on recently deposited alluvium or recently disturbed river channels that are early seral. The soils are sand, gravel and cobble. The pH is neutral and no permafrost at 1 m.
Landcover class: Sparsely Vegetated
Vegetation: Species dominance is variable. *Chamerion latifolium* often dominates or may be sub-dominant. *Artemisia alaskana* may also dominate. Other species that may co-dominate include *Artemisia tilesii*, *Astragalus australis*, *Bromus inermis* ssp. *pumpellianus*, *Elymus trachycaulus* ssp. *trachycaulus*, *Festuca rubra* ssp. *arctica* and *Hedysarum boreale* ssp. *mackenziei.* Moss is often absent but some sites may support a moderate cover such as *Bryum* spp.

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix alaxensis	3	100
Artemisia alaskana	5	50
Forb		
Artemisia tilesii	3	50
Astragalus alpinus	0	50
Astragalus australis	2	50
Chamerion latifolium	10	100
Equisetum arvense	0	50
Equisetum variegatum	0	50
Eurybia sibirica	0	50
Hedysarum boreale ssp. *mackenziei*	2	50
Lupinus arcticus	1	50
Oxytropis deflexa var. *foliolosa*	0	50
Pyrola secunda	0	50
Graminoid		
Bromus inermis ssp. *pumpellianus* var. *arcticus*	2	50
Elymus trachycaulus ssp. *trachycaulus*	2	50
Festuca rubra ssp. *arctica*	3	50
Hierochloe odorata	1	50
Juncus castaneus	0	50
Poa glauca	2	50
Moss		
Bryum	13	50

***Deschampsia cespitosa* Sparse (Inland Dune) Plant Association**
Tufted hairgrass Sparse (Inland Dune) Plant Association

Plots sampled: 1
Rank: G3; S3

Deschampsia cespitosa Sparse (Inland Dune) Plant Association in a drained lake north of Inigok, Alaska.

Other studies: Not previously described, but other *Deschampsia cespitosa* associations have been described.
Distribution: Occurs on drained lakes on the Coastal Plain sandsheet.
Patch size: Small to large
Elevation: 50 m
Slope: 0 to 5°
Landform: Sandy bottoms of drained lakes on the Coastal Plain sandsheet.
Hydrology: Dry
Soil: Sandy C horizons. No permafrost at 1 m. pH 8.8
Landcover class: Sparsely Vegetated
Vegetation: These are early-seral sites. The soil surface is sand with widely distributed *Deschampsia cespitosa*. Trace species include *Elymus alaskanus* ssp. *alaskanus*, *Festuca rubra*, and *Artemisia campestris* ssp. *borealis*.

***Dryas octopetala-Saxifraga oppositifolia* Sparse (Alkaline) Plant Association**
White mountain avens-Purple saxifrage Sparse (Alkaline) Plant Association

Plots sampled: 1
Rank: G4; S4

Dryas octopetala-Saxifraga oppositifolia Sparse (Alkaline) Plant Association on a sideslope in the central Brooks Range, Alaska.

Other studies: Similar to the Alpine Alkaline Barrens Ecotype (Jorgenson et al. 2009).
Distribution: Common throughout the Brooks Range and Brooks Range Foothills.
Patch size: Small to matrix forming
Elevation: > 300 m elevation
Slope: Low angle to steep
Landform: Occurs on upper slopes, shoulders, ridge crests, and plateaus on carbonate sedimentary bedrock, metamorphic carbonate (marble) bedrock, weathered bedrock, hillside colluvium, and talus.
Hydrology: Dry to mesic
Soil: Soil is alkaline due to carbonate-rich parent material. Soils are blocky or rubbly and typically lack a surface organic horizon (Jorgenson et al. 2009). Frost boils are rare, and loess caps are absent. Surface fragments are common and abundant.
Landcover class: Sparsely Vegetated
Vegetation: Due to the low number of plots (1) we sampled in this association, we chose to use the Alpine Alkaline Barrens ecotype species information from Jorgenson et al. (2009). Vegetation cover is sparse, although species diversity is high. Shrubs taller than 20 cm are absent. Total non-vascular cover is low, and not always present at sites. *Saxifraga oppositifolia* has the highest constancy. Common shrubs include *Dryas octopetala* and *Salix rotundifolia.* Common herbaceous species include *Androsace chamaejasme, Oxytropis nigrescens* and *Saxifraga oppositifolia,* and common lichens include *Cetraria* spp., *Flavocetraria cucullata, Flavocetraria nivalis,* and *Thamnolia* spp.

Due to the limestone substrate, several rare species occur in this ecotype, including *Papaver gorodkovii, Papaver walpolei* and *Campanula aurita.*

***Salix alaxensis* Sparse (Floodplain) Plant Association**
Feltleaf willow Sparse (Floodplain) Plant Association

Plots sampled: 8 BLM AIM plots: We did not provide a Con/Cov table because the AIM plots used foliar cover in contrast to canopy cover used in this project.
Rank: G5; S5

Salix alaxensis Sparse (Floodplain) Plant Association on a floodplain near Inigok, Alaska.

Other studies: Not previously described.
Distribution: Common on active floodplains of the Coastal Plain, Brooks Range Foothills and Brooks Range.
Patch size: Typically small and linear
Elevation: Low to mid elevation
Slope: 0 to 10°
Landform: On floodplains and deltas it occurs on recently deposited alluvium or recently disturbed river channels that are early seral.
Hydrology: Dry during low flows to wet when flooded.
Soil: Soils are typically sand, gravel or cobble C horizons. pH 6.9 to 8.5. No permafrost at 1 m.
Landcover class: Sparsely Vegetated
Vegetation: On floodplains, *Salix alaxensis* is present. Other common early seral species include the shrubs *Arctous rubra, Dryas integrifolia, Salix glauca,* and herbaceous species *Festuca rubra* ssp. *arctica, Artemisia alaskana, Artemisia tilesii, Chamerion latifolium, Hedysarum boreale* ssp. *mackenziei* and *Oxytropis campestris*. The cover of bryophytes, such as *Bryum* spp., sometime exceeds 25%.

***Salix niphoclada-Salix glauca* Sparse (Inland Dune) Plant Association**
Barrenground willow-Grayleaf willow Sparse (Inland Dune) Plant Association

Plots sampled: 7 BLM AIM plots: We did not provide a Con/Cov table because the AIM plots used foliar cover in contrast to canopy cover used in this project.
Rank: G3; S3

Salix niphoclada-Salix glauca Sparse (Inland Dune) Plant Association on dunes near Inigok, Alaska.

Other studies: Not previously described.
Distribution: Occurs on river dunes and unstable sandy slopes bordering lakes in the Coastal Plain, Brooks Range Foothills and Brooks Range. Generally uncommon, but relatively common on the sandsheet region of the Coastal Plain.
Patch size: Small to large
Elevation: 1 to 803 m
Slope: 0 to 60°
Landform: River dunes and unstable sandy slopes bordering lakes.
Hydrology: Dry to mesic
Soil: Sandy C horizons often over buried organic horizons. No permafrost at 1 m.
Landcover class: Sparsely Vegetated
Vegetation: These are early-seral sites with variable species composition. The shrubs *Salix alaxensis*, *Salix glauca* and *Salix niphoclada* are typically present. Common herbaceous species include *Festuca rubra, Leymus mollis, Artemisia tilesii* ssp. *elatior*, *Chamerion latifolium*, and *Equisetum arvense*. Bryophyte cover is low although some sites support extensive biological crusts. Several rare species such as *Koeleria asiatica*, *Poa hartzii*, *Poa subulata*, *Rumex graminifolius* and *Mertensia drummondii* occur regularly on inland dune sites.

***Umbilicaria* spp. Sparse (Talus Field) Plant Association**
Umbilicaria spp. Sparse (Talus Field) Plant Association

Plots sampled: 2
Rank: G4; S4

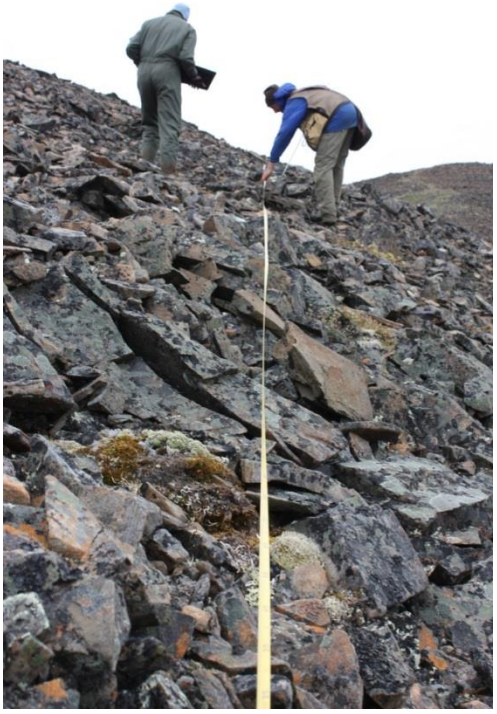
Umbilicaria spp. Sparse (Talus Field) Plant Association on a talus slope in central Brooks Range, Alaska.

Other studies: Similar to the *Umbilicaria* spp.-*Rhizocarpon* spp. (Hanson 1953, Klein 1959, Kessel and Schaller 1960, Pegau 1968, Rausch and Rausch 1968, Anderson 1974, Webber et al. 1978) and several other studies.
Distribution: Common on talus slopes throughout the Brooks Range.
Patch size: Small to large
Elevation: Mid to high elevations
Slope: Steep
Landform: Talus on mountain side-slopes and summits. Much of the rock surface has crustose lichens. This suggests that the surface layer of rocks is stable.
Hydrology: Dry to mesic
Soil: Some soil development between rocks. C horizon (generally with high coarse rock component). One pH of 5.3.
Landcover class: Sparsely Vegetated
Vegetation: Crustose lichens (species not recorded) are abundant on the exposed rock. Common foliose and fruticose lichens include *Umbilicaria, Alectoria, Brodoa oroarctica, Sphaerophorus globosus, Melanelia* spp. and *Stereocaulon s*pp. Vascular plant cover is usually low and characterized by alpine grasses and forbs growing in more stable portions of the talus slope or pockets of soil. Common species include *Smelowskia calycina* var. *porsildii, Potentilla elegans, Potentilla uniflora, Cardamine bellidifolia,*

Minuartia macrocarpa, Silene uralensis ssp. *uralensis, Festuca brachyphylla, Luzula confusa,* and *Poa arctica.*

The following tabulation lists the species that occur in this association and gives the average canopy cover (Cov %) percent and constancy (Con %) percent. 0 = < 1 % cover.

Species	Cov %	Con %
Shrub		
Salix arctica	0	100
Forb		
Artemisia arctica ssp. *arctica*	0	50
Arnica lessingii	0	50
Cardamine bellidifolia	0	100
Draba pilosa	0	50
Minuartia macrocarpa	0	100
Minuartia obtusiloba	0	50
Papaver macounii	0	50
Potentilla elegans	0	100
Potentilla uniflora Ledeb.	0	100
Ranunculus lapponicus	1	50
Saxifraga bronchialis	0	50
Saxifraga eschscholtzii	0	50
Saxifraga nivalis	0	50
Saxifraga serpyllifolia	0	50
Saxifraga tricuspidata	0	50
Selaginella sibirica	0	50
Silene acaulis	0	50
Silene uralensis ssp. *uralensis*	0	100
Smelowskia calycina var. *porsildii*	1	100
Graminoid		
Carex microchaeta	0	50
Festuca brachyphylla	0	100
Luzula arcuata	0	50
Luzula confusa	0	100
Poa alpina	0	50
Poa arctica	0	100
Poa glauca	0	50
Poa pratensis ssp. *alpigena*	0	50
Trisetum spicatum	0	50
Lichen		
Alectoria	2	50
Asahinea chrysantha	0	50
Bryocaulon divergens	0	50
Brodoa oroarctica	2	50
Cetraria	0	50
Melanelia	1	50
Sphaerophorus globosus	1	50
Stereocaulon	1	50
Umbilicaria	16	100
Moss		
Dicranum	0	50
Pogonatum	0	50
Polytrichum	0	50



Talus slope in central Brooks Range.

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