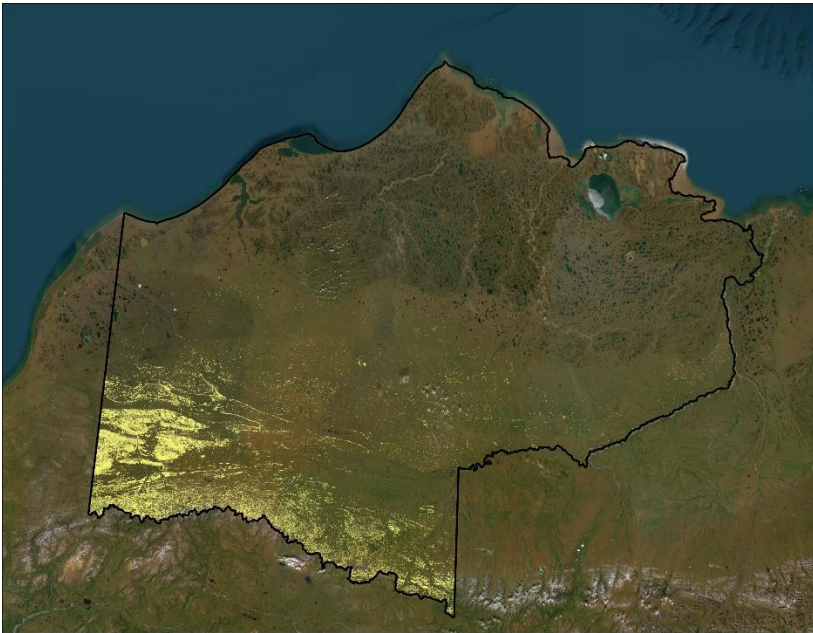


Arctic Dwarf Shrub Tundra



Stratum code: ADST

Number of plots sampled: 12

Physiography: alpine and subalpine (Brooks Range Mountains and Foothills physiographic units)

Geomorphology: mountain, hill

Landforms: slope, ridge, summit

Hydrology: mesic, moderately drained

Classification: An alpine tundra type. Average cover of shrub is 47.6% with dwarf shrubs 46.0% dominating. Average cover of taxa in the *Rosaceae* family, represented by the *Dryas* genera, is 32.6%.

Site characteristics: Typically developing at lower elevations, or in more protected sites than Alpine Barrens. A heterogenous type where bare ground averages 26.4% cover and vegetation transitions from sparse in areas of shallow bedrock and talus to lush in areas of late-lying snow. Characterized by dry permafrost.

Soil characteristics: Soils are minimally developed. The thickness of moss and duff combined averages only 0.7 cm; the underlying organic horizon averages 1.8 cm. Organic material is underlain by a mineral horizon with high coarse-rock component that extends to bedrock. A thin A horizon may develop at the transition from organic to mineral soil. Average soil water pH measured at 10 cm depth is 6.9.

Vegetation: Dwarf shrubs in the *Dryas* genus dominate this type. The low to dwarf shrubs, *Vaccinium vitis-idaea*, *Salix pulchra*, and *Betula nana* are subdominant. Of the three *Dryas* species occurring, *Dryas ajanensis* ssp. *beringensis* indicates the type; the dwarf shrub *Salix phlebophylla* and the forb, *Oxytropis bryohiila*, also have indicator potential. Herbaceous cover is generally low (mean 18.2%) and

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composition is variable. Among graminoids and forbs, *Carex scirpoidea*, and *Lupinus arcticus* show relatively high abundances and frequencies. Lichens in the *Alectoria* genus are relatively common and indicate the type. The greater presence of feathermosses such as *Rhytidium* and larger forbs such as *Lupinus arcticus* differentiates Alpine Dwarf Shrub Tundra from Alpine Barrens. Mean vascular species richness is 37 taxa.

Dominant Species (greater than 25% average cover):

- *Dryas integrifolia*
- *Dryas alaskensis*

Indicator Species (species with significant potential to indicate the stratum ($p < 0.0002$) listed in decreasing order of indication):

- *Dryas ajanensis* ssp. *beringensis*
- *Oxytropis bryophila*
- *Salix phlebophylla*
- *Alectoria*

Succession and disturbance: A late successional type subject to small scale disturbances such as wildlife digging where permafrost is dry, and frost boils and solifluction in ice rich permafrost.

Indicators of change: Change in structure or composition (height of dominant shrubs or shrub encroachment). For example, increase of deciduous shrub cover or height is expected to trap snow, resulting in a shift to moist tundra and through shading, moderate the microclimates that currently support a diversity of cryptic non-vascular and herbaceous species, thereby depressing species richness. Likely transition towards Foothills Low Shrub Tundra.

Note: this is a heterogenous type that includes vegetation growing on calcareous and non-calcareous substrates; the analysis presented

here would be strengthened by separating plots by substrate type and increasing sample size.



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Table 1. Cover and constancy of plant taxa occurring in the Alpine Dwarf Shrub Tundra stratum. Species listed by habit, in decreasing order of percent cover.

Habit	Scientific Name	Average Cover (%)	Standard Deviation (%)	Minimum Cover (%)	Maximum Cover (%)	Constancy (%)
tall shrub	<i>Salix pulchra</i>	6.7	na	6.7	6.7	8
	<i>Betula nana</i>	6.0	na	6.0	6.0	8
	<i>Salix glauca</i>	4.0	3.8	1.3	6.7	17
	<i>Salix alaxensis</i>	2.0	na	2.0	2.0	8
	<i>Salix niphoclada</i>	2.0	na	2.0	2.0	8
low shrub	<i>Rhododendron tomentosum</i> ssp. <i>decumbens</i>	5.3	na	5.3	5.3	8
	<i>Vaccinium uliginosum</i>	4.9	2.7	2.0	7.3	25
	<i>Salix arctica</i>	2.0	0.0	2.0	2.0	17
	<i>Rhododendron lapponicum</i>	2.0	na	2.0	2.0	8
dwarf shrub	<i>Dryas integrifolia</i>	41.5	14.8	24.7	56.0	42
	<i>Dryas alaskensis</i>	38.7	na	38.7	38.7	8
	<i>Dryas ajanensis</i> ssp. <i>beringensis</i>	23.5	7.9	11.3	33.3	50
	<i>Vaccinium vitis-idaea</i>	10.7	5.4	4.7	15.3	25
	<i>Cassiope tetragona</i>	5.3	5.1	1.3	14.7	50
	<i>Empetrum nigrum</i>	5.3	na	5.3	5.3	8
	<i>Salix phlebophylla</i>	4.1	2.1	2.0	8.0	50
	<i>Arctous rubra</i>	4.0	na	4.0	4.0	8
	<i>Diapensia obovata</i>	4.0	na	4.0	4.0	8
	<i>Salix rotundifolia</i>	4.0	na	4.0	4.0	8
	<i>Salix reticulata</i>	3.7	1.1	2.7	5.3	42
graminoid	<i>Carex rotundata</i>	17.3	na	17.3	17.3	8
	<i>Carex bigelowii</i> ssp. <i>ensifolia</i>	9.3	12.2	1.3	23.3	25
	<i>Carex scirpoidea</i>	6.0	2.0	4.0	8.0	25
	<i>Carex microchaeta</i>	3.3	na	3.3	3.3	8
	<i>Carex rupestris</i>	3.3	na	3.3	3.3	8
	<i>Eriophorum vaginatum</i>	3.3	na	3.3	3.3	8
	<i>Hierochloë alpina</i>	3.0	2.4	1.3	4.7	17
	<i>Carex myosuroides</i>	2.7	na	2.7	2.7	8
	<i>Carex obtusata</i>	2.0	na	2.0	2.0	8
	<i>Poa arctica</i>	2.0	na	2.0	2.0	8

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Habit	Scientific Name	Average Cover (%)	Standard Deviation (%)	Minimum Cover (%)	Maximum Cover (%)	Constancy (%)
	<i>Arctagrostis latifolia</i>	1.3	na	1.3	1.3	8
	<i>Carex fuliginosa</i> ssp. <i>misandra</i>	1.3	na	1.3	1.3	8
	<i>Deschampsia brevifolia</i>	1.3	na	1.3	1.3	8
	<i>Festuca brachyphylla</i>	1.3	na	1.3	1.3	8
	<i>Poa glauca</i>	1.3	na	1.3	1.3	8
forb	<i>Gentiana glauca</i>	7.3	na	7.3	7.3	8
	<i>Saxifraga oppositifolia</i> ssp. <i>smalliana</i>	7.3	na	7.3	7.3	8
	<i>Saxifraga tricuspidata</i>	6.7	na	6.7	6.7	8
	<i>Coptidium lapponicum</i>	4.7	na	4.7	4.7	8
	<i>Lupinus arcticus</i>	4.7	4.2	1.3	10.7	33
	<i>Bupleurum americanum</i>	4.0	na	4.0	4.0	8
	<i>Bistorta vivipara</i>	3.3	na	3.3	3.3	8
	<i>Hedysarum americanum</i>	2.7	na	2.7	2.7	8
	<i>Silene acaulis</i>	2.7	na	2.7	2.7	8
	<i>Oxytropis bryophila</i>	2.4	0.8	1.3	3.3	50
	<i>Campanula lasiocarpa</i>	2.0	na	2.0	2.0	8
	<i>Saxifraga funstonii</i>	2.0	na	2.0	2.0	8
	<i>Antennaria friesiana</i>	1.3	0.0	1.3	1.3	17
	<i>Arnica lessingii</i>	1.3	na	1.3	1.3	8
	<i>Chamaenerion latifolium</i>	1.3	na	1.3	1.3	8
	<i>Cherleria arctica</i>	1.3	na	1.3	1.3	8
	<i>Gentianella propinqua</i>	1.3	na	1.3	1.3	8
	<i>Saxifraga</i>	1.3	na	1.3	1.3	8
<i>Smelowskia porsildii</i>	1.3	na	1.3	1.3	8	
spore-bearing	<i>Equisetum arvense</i>	8.7	na	8.7	8.7	8
	<i>Selaginella sibirica</i>	1.7	0.5	1.3	2.0	17
moss	<i>Hypnum</i>	14.4	5.2	10.7	18.0	17
	<i>Rhytidium</i>	11.9	20.3	1.3	48.0	42
	<i>Scorpidium</i>	7.3	na	7.3	7.3	8
	<i>Hylocomium</i>	5.7	5.3	1.3	13.3	33
	<i>Tomentypnum</i>	5.1	2.7	2.7	8.0	25
	<i>Flexitrichum</i>	4.7	na	4.7	4.7	8
	<i>Polytrichum</i>	4.0	1.0	3.3	4.7	17

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Habit	Scientific Name	Average Cover (%)	Standard Deviation (%)	Minimum Cover (%)	Maximum Cover (%)	Constancy (%)
	<i>Dicranum</i>	3.3	2.7	1.3	7.3	33
	<i>Racomitrium</i>	2.9	1.4	1.3	4.0	25
	<i>Pleurozium</i>	2.7	na	2.7	2.7	8
	<i>Abietinella</i>	2.2	1.0	1.3	3.3	25
	<i>Aulacomnium</i>	1.6	0.6	1.3	2.7	42
	<i>Brachythecium</i>	1.3	na	1.3	1.3	8
	<i>Catoscopium</i>	1.3	na	1.3	1.3	8
	<i>Distichium</i>	1.3	na	1.3	1.3	8
lichen	<i>Thamnolia</i>	6.0	3.0	2.7	10.0	67
	crustose lichen	5.4	1.9	4.0	6.7	17
	<i>Bryocaulon</i>	4.0	na	4.0	4.0	8
	<i>Alectoria</i>	3.2	1.0	2.7	4.7	33
	<i>Flavocetraria</i>	2.9	1.6	1.3	5.3	83
	<i>Cladonia</i>	2.1	0.7	1.3	2.7	50
	<i>Bryoria</i>	2.0	na	2.0	2.0	8
	<i>Nephroma</i>	2.0	na	2.0	2.0	8
	<i>Asahinea</i>	1.7	0.5	1.3	2.0	17
	<i>Lobaria</i>	1.7	0.5	1.3	2.0	17
	<i>Sphaerophorus</i>	1.7	0.5	1.3	2.0	17
	<i>Peltigera</i>	1.3	0.0	1.3	1.3	25
	<i>Dactylina</i>	1.3	0.0	1.3	1.3	17
	<i>Stereocaulon</i>	1.3	na	1.3	1.3	8
liverwort	liverwort	2.0	na	2.0	2.0	8