DEPARTMENT OF ENERGY, R4D PROGRAM
DATA REPORT

PERMANENT VEGETATION PLOTS

Site factors, soil physical and chemical properties, and plant species cover

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INTRODUCTION

This data report is a summary of environmental, soil, and vegetation information collected from 73 study plots at the R4D research site near Toolik Lake, Alaska (Figure 1, foldout). It brings together for easy reference all the available plot data and supercedes earlier data reports (Walker et al. 1985). This information is being used in the classification and mapping of the vegetation and the analysis of the environmental controls (Walker et al. 1987). It provides useful input to several phases of the R4D research including the landscape ecology, slope modeling, and the primary productivity studies.

Plot Locations

The field sampling was conducted during the periods of August 1–10, 1984 and August 17–September 4, 1985. During the same periods, field surveys were conducted for geobotanical mapping (Walker et al. 1987). Sixty-seven of the plots were permanently marked as indicated below. Plots SW–67 through SW–71 were sampled during the mapping transects and were remote from the intensive study site, and, therefore, were not permanently marked.

The sampling was done in representative examples of the major vegetation community types, particularly of the area within the main R4D watershed. Figure 1 (foldout) shows the location of the permanent study plots. Table 1 is a summary of the plant communities and the microsites that were sampled, and Table 2 lists the major microsite categories and the sample plots in each category.

Plot Size

Circular (5 m diameter) vegetation plots were placed in areas of homogeneous vegetation. The 19.6 m^2 plots were within the 10–50 m^2 minimal area recommended for healthland samples and somewhat smaller than the 50–100 m^2 recommended for scrub communities (Westhoff and van der Maarel 1978). In areas where the homogeneous vegetation was insufficient for a plot of this shape (e.g. narrow water tracks), the plot was shaped to accommodate homogeneous vegetation of equal area. In areas where there was a tight mosaic of vegetation types, such as in frost scars or in areas of strangmoor, the plot was sampled in two parts representing the included microsites, and an estimate was made of the area covered by each microsite (the total adding to 100%).

Plot Markings

Each plot was marked with a 1.3 m high wooden lathe in the center of the plot and three short stakes on the perimeter of the plot. An aluminum identification tag was

attached to the center stake (Fig. 2). Each plot was photographed at the time of sampling. Photos of the plots and soils are in the Appendix.

Photo Plot

Within each permanent plot, a smaller 1-m^2 photo-plot was marked for periodic close-up photos to record long-term changes due to mortality, recruitment, disturbance, or climate changes. This plot was marked with four wire flags and string around the perimeter of the plot (Fig. 2).

SITE FACTORS

The site of each plot was described according to the variables listed in Table 3 plus measurements of thaw depth (at time of vegetation sampling), snow depth (May 16–17, 1986), and estimates of cover of bare soil, rocks, and the major plant growth forms. Table 4 summarizes these data. (Note: some plots have subplot designations. For example plot SW–4 had two microsites, SW–4A and SW–4B.)

SOILS

Field Sampling

Soil pits were dug adjacent to the plots and described and classified according to the U.S. soil taxonomy (Soil Survey Staff 1975). Soil samples were collected from each horizon and air dried in the laboratory. Soil moisture and bulk density samples were collected from each plot on August 28, 1985, following an extended period of dry weather.

Laboratory Analysis

Laboratory analyses were conducted at INSTAAR on soils from 10–cm depth (rhizosphere) for all plots. Several plots (SW–2, 6, 8, 11, 16, 19, 22A, 24, 32, 33, and 42) were selected as typical of the common community types. Soil descriptions for these plots are in Table 5, and soil analyses were run on all horizons below the Oi horizon.

Physical properties. Bulk density samples were taken from the sides of the soil pits or from large soil plugs (for very wet soils) using the core method (Blake and Hartge 1986). Bulk density was calculated as the weight of the oven–dried (105^0C) sample divided by the volume of the sample. Weight of gravel was not subtracted from the sample. Organic matter was determined by the Walkley–Black procedure (Nelson and Sommers 1982), with results reported as percentage total organic matter. Particle size samples were treated with H_2O_2 to remove organic matter. Silt and clay were separated using the pipette method (Gee and Bauder 1986). The physical properties are reported in Table 6.

Chemical properties. Soil pH was measured using the water–saturation percentage preparation (saturated paste) method of Jackson (1958). The pH was measured using a Chemtrix Type 400 pH meter.

Cations (Ca, Mg, and K) were extracted using the ammonium acetate method (Thomas 1982). Approximately 2 g of soil were used for the organic horizons and 5 g for the mineral horizons. The filtrate was analyzed using a Perkin–Elmer Atomic Absorption Spectrophotometer Model No. 2280.

NO_3 was extracted with KCl (Keeney and Nelson 1982). A 10 millimole KCl solution was used instead of the 2N solution of the method because potassium of the 2N KCl solution swamped the ion exchange column on the Dionex 2010i Ion Chromatograph (see Dick and Tabatabai 1979 and Eubanks and Joyce 1985). Chemical properties are reported in Table 7.

VEGETATION

Field Methods and Raw Species Data

Percentage cover of all plant taxa was visually estimated. For plots with more than one microsite, percentage cover of species was estimated separately for each microsite within the plot. Voucher collections were made for all vascular plants, bryophytes, and lichens occurring in the plot. These were verified by Dr. Dave Murray, University of Alaska Herbarium (AKA). Table 8 contains the raw species data for the 73 plots.

Sorted Species Table

Appendix 2 (online version unavailable) is a sorted table that groups the plots into community types. Characteristic and associated species are grouped together for each community type following the table analysis techniques of the Braun–Blanquet approach (Mueller–Dombois and Ellenberg 1974). The species were ordered using the following set of rules regarding their fidelity to a given community type: characteristic species were those that occurred in more than 50% of a given group and less than 33% of the remaining plots; associated species were those that either occurred in more than 40% of a given group and less than 25% of the remaining plots or where more than 50% of the total occurrences were within the given group. The final ordering of the table was accomplished using an iterative manual sorting procedure and a FORTRAN program LISTEML written by Margaret Eccles at INSTAAR. A total of 12 iterations were used to produce the final synthesis table.

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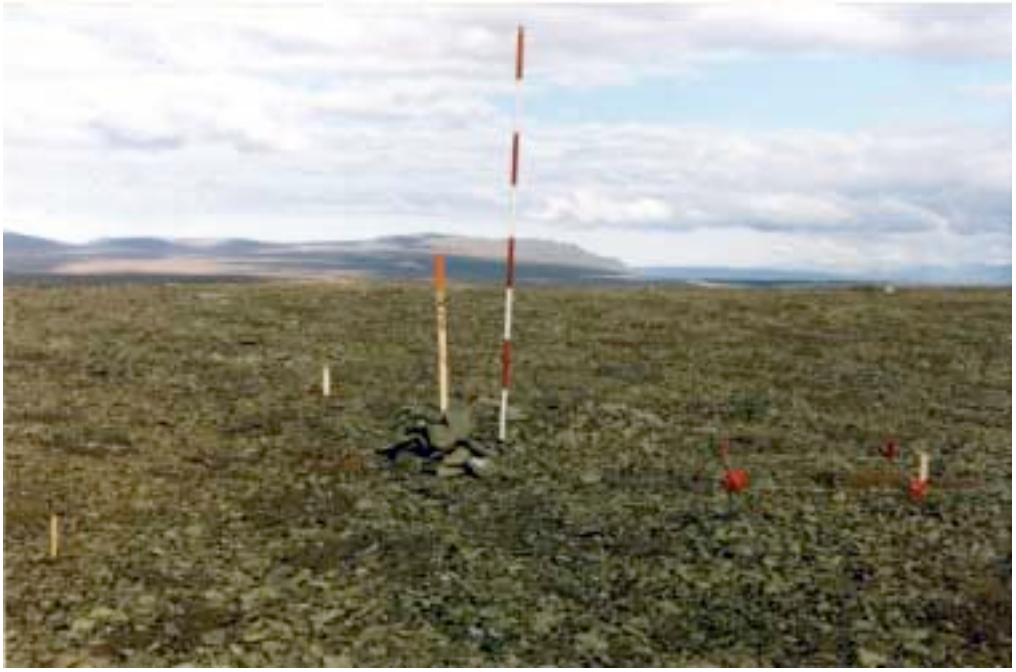

Figure 2. Vegetation plot layout. The plot is a 5-meter circle. Note the 1 m^2 photo plot. The scale rod in the center of the plot shows 1-foot intervals.

Table 1. List of vegetation communities and microsites sampled in 1984 and 1985

Plot No.	Plant Community	Microsite
SW-1	Moist *Carex bigelowii, Salix planifolia* ssp. *pulchra, Vaccinium uliginosum, Sphagnum rubellum, Hylocomium splendens* sedge, dwarf-shrub tundra	Inter-water-track area
SW-2	Wet *Salix planifolia* ssp. *pulchra, Eriophorum angustifolium, Drepanocladus uncinatus* low-shrub, sedge tundra	Well developed water track
SW-3	Moist *Eriophorum vaginatum, Carex bigelowii, Salix planifolia* ssp. *pulchra, Ledum palustre ssp. decumbens, Betula nana, Hylocomium splendens, Aulacomnium turgidum* tussock-sedge, dwarf-shrub tundra	Inter-water-track area
SW-4a	Wet *Eriophorum vaginatum, Carex bigelowii, Salix planifolia* ssp. *pulchra, Drepanocladus uncinatus* tussock-sedge, dwarf-shrub tundra	Weakly developed water track
SW-4b	Moist *Salix planifolia* ssp. *pulchra, Vaccinium uliginosum, Carex bigelowii, Sphagnum rubellum, Aulacomnium palustre* low-shrub tundra	Margin of water tracks
SW-5	Wet *Betula nana, Salix planifolia* ssp. *pulchra, Carex bigelowii, Hylocomium splendens,* very little *Sphagnum* spp. low-shrub tundra	Weakly defined water track
SW-6	Moist *Carex bigelowii, Betula nana, Salix planifolia* ssp. *pulchra, Ledum palustre* ssp. *decumbens, Hylocomium splendens, Sphagnum* ssp. sedge, dwarf-shrub tundra	Inter-water-track site with weakly developed solifluction features
SW-7	Wet *Salix planifolia* ssp. *pulchra, Carex bigelowii, Eriophorum vaginatum, Rubus chamaemorus, Hylocomium splendens, Sphagnum* ssp. low-shrub tundra	Weakly defined water track
SW-8	Moist *Carex bigelowii, Betula nana, Ledum palustre* ssp. *decumbens, Sphagnum* spp. sedge, dwarf-shrub tundra	Inter-water-track area
SW-9	Dry *Arctous alpina, Salix phlebophylla, Cetraria nivalis, Sphaerophorus globosus,* dwarf-shrub, fruticose-lichen tundra	Dry rocky till
SW-10	Moist *Betula nana, Salix planifolia* ssp. *pulchra, Carex bigelowii, Sphagnum* spp. Low-shrub tundra	Margin of water track
SW-11	Wet *Salix planifolia* ssp. *pulchra, Eriophorum angustifolium. Betula nana, Sphagnum* spp., low-shrub, sedge tundra	Well developed water track
SW-12	Moist *Carex bigelowii, Betula nana, Salix planifolia* ssp. *pulchra, Eriophorum vaginatum, Sphagnum* spp., *Hylocomium splendens*, sedge, dwarf-shrub tundra	Inter-water-track area
SW-13	Moist *Betula nana*, *Salix planifolia* ssp. *pulchra*, *Carex bigelowii, Sphagnum* spp., *Hylocomium splendens* low-shrub, sedge tundra	Inter-water-track area, footslope of west-facing hill
SW-14	Wet *Carex aquatilis, Rubus chamaemorus, Salix fuscescens, Sphagnum* spp., sedge, dwarf-shrub, moss tundra	Flat creek margin
SW-15	Moist *Betula nana, Rubus chamaemorus, Salix fuscescens, Sphagnum* spp., *Aulacomnium turgidum*, dwarf-shrub, moss tundra	Slightly raised streamside site
SW-16	Aquatic *Carex aquatilis, Eriophorum angustifolium*, sedge tundra	Stream channel
SW-17	Moist *Betula nana, Eriophorum vaginatum, Rubus chamaemorus, Sphagnum* spp., tussock-sedge, dwarf-shrub, moss tundra	Inter-water-track area, footslope of west-facing hill

Table 1. List of vegetation communities and microsites sampled in 1984 and 1985

Plot No.	Plant Community	Microsite
SW-18	Wet *Carex aquatilis, Salix fuscescens, Salix chamissonis, Carex rariflora, Sphagnum* spp., sedge tundra	Wet meadow with strangmoor
SW-19	Wet *Eriophorum scheuchzeri, Salix fuscescens, Sphagnum lenense*, sedge, dwarf-shrub, moss tundra	Wet meadow
SW-20	Wet *Carex rotundata, Eriophorum scheuchzeri, Salix fuscescens, Sphagnum lenense* sedge, dwarf-shrub, moss tundra	Wet meadow
SW-21a	Wet *Carex rotundata, C. rariflora, Eriophorum scheuchzeri, Sphagnum imbricatum* sedge tundra	Inter-hummock in wet meadow with strangmoor
SW-21b	Moist *Betula nana, Vaccinium uliginosum, Sphagnum lenense* dwarf-shrub tundra	Hummocks in wet meadow with strangmoor
SW-22a	Wet *Carex rariflora, C. rotundata, Eriophorum scheuchzeri, Sphagnum lindbergii* sedge tundra	Inter-hummock areas in wet meadow
SW-22b	Wet *Eriophorum scheuchzeri, Andromeda polifolia, Salix fuscescens, Sphagnum lenense* sedge, dwarf-shrub tundra	Hummocks in wet meadow
SW-23	Aquatic *Carex aquatilis, C. rotundata*, sedge tundra	Stream channel
SW-24	Moist *Betula nana, Rubus chamaemorus, Ledum palustre* ssp. *decumbens, Dicranum elongatum, Sphagnum* spp., *Cladonia* spp. dwarf-shrub, fruticose-lichen tundra	Palsa
SW-25a	Moist *Carex rariflora, Betula nana, Salix fuscescens, Sphagnum* spp. sedge, dwarf-shrub tundra	Hummock in strangmoor area
SW-25b	Wet *Carex rariflora, Eriophorum scheuchzeri, C. rotundata, Sphagnum imbricatum* sedge tundra	Inter-hummock sites in strangmoor area
SW-26	Dry *Cassiope tetragona, Vaccinium uliginosum, Carex bigelowii, Tortula ruralis, Dicranum elongatum, Cetraria nivalis, Cladonia* spp. fruticose lichen tundra	Dry stone stripe with frost scars on shoulder of hill
SW-27	Moist *Carex bigelowii, Salix planifolia* ssp. *pulchra, S. reticulata, Cassiope tetragona, Hylocomium splendens, Dicranum fuscescens* sedge, dwarf-shrub tundra	Wetter area between stone stripes
SW-28	Dry *Arctous alpina, Salix phlebophylla, Diapensia lapponica, Dicranum elongatum, Alectoria nigricans, Cetraria nivalis* dwarf-shrub, fruticose-lichen tundra	Rocky till deposit on hill crest
SW-29a	Moist *Betula nana, Ledum palustre ssp. decumbens, Calamagrostis inexpansa, Salix phlebophylla, Dicranum fuscescens, Cladonia rangiferina* dwarf-shrub, grass, fruticose-lichen tundra	Inter-frost-scar areas on stone stripe
SW-29b	Dry *Arctous alpina, Luzula arctica, Polytrichum strictum, Alectoria ochroleuca* barren	Frost scars on stone stripe
SW-30a	Moist *Betula nana, Salix phlebophylla, Cassiope tetragona, Carex bigelowii, Dicranum elongatum, Cladonia rangiferina* dwarf-shrub, fruticose-lichen tundra	Inter-frost-scar areas on stone stripe
SW-30b	Dry *Salix phlebophylla, Luzula arctica, Diapensia lapponica, Rhacomitrium lanuginosum, Alectoria ochroleuca* barren	Frost scars on stone stripe
SW-31	Moist *Carex bigelowii, Salix planifolia* ssp. *pulchra, Petasites frigidus, Dicranum* sp., *Hylocomium splendens* sedge, dwarf-shrub tundra	Wetter area between stone stripes
SW-32a	Moist *Cassiope tetragona, Salix phlebophylla, Dicranum elongatum, Cladonia rangiferina* dwarf-shrub, fruticose-lichen tundra	Inter-frost-scar areas on stone stripe

Table 1. List of vegetation communities and microsites sampled in 1984 and 1985

Plot No.	Plant Community	Microsite
SW-32b	Dry *Salix phlebophylla, Luzula arctica* barren	Frost scars on stone stripe
SW-33	Dry *Dryas octopetala, Salix phlebophylla, Hierochloe alpina* dwarf-shrub tundra	Dry southwest-facing sandstone outcrop
SW-34	Wet *Salix planifolia* ssp. *pulchra, Eriophorum angustifolium, Petasites frigidus, Drepanocladus uncinatus, Sphagnum* spp. low-shrub, sedge tundra	Well developed water track
SW-35a	Moist *Salix planifolia* ssp. pulchra, *Carex bigelowii, Petasites frigidus, Aulacomnium palustre, Sphagnum* spp. low-shrub tundra	Tops of weakly developed solifluction lobes in water track margin
SW-35b	Wet *Eriophorum angustifolium*, *Salix planifolia* ssp. *pulchra*, *Aulacomnium palustre*, *Drepanocladus uncinatus*, *Sphagnum angustifolium*, *Sphagnum* spp., Sedge, moss tundra	Interhummock areas
SW-36a	Wet *Salix planifolia* ssp. *pulchra, Eriophorum angustifolium, Petasites frigidus, Hylocomium splendens, Aulacomnium palustre, Sphagnum* spp. low-shrub, sedge tundra	Tops of solifluction hummocks in water track
SW-36b	Wet *Eriophorum angustifolium, Salix planifolia* ssp. *pulchra, Drepanocladus uncinatus, Sphagnum* spp. sedge, low shrub tundra	Inter-hummock areas in water track
SW-37	Aquatic *Sparganium hyperboreum, Hippuris vulgaris, Calliergon sarmentosum* forb marsh	Pond in beaded stream
SW-38	Dry *Arctous alpina, Vaccinium vitis-idaea, Dicranum elongatum, Cetraria nivalis, Cornicularia divergens, Cladonia* spp. dwarf-shrub, fruticose-lichen tundra	Rocky till, shoulder of hill
SW-39	Dry *Vaccinium vitis-idaea, Hierochloe alpina, Salix phlebophylla, Dicranum elongatum, Cetraria nivalis, Cladonia* spp. dwarf-shrub, fruticose-lichen tundra	Slight depression in dry till at crest of hill
SW-40	Dry *Cassiope tetragona, Carex microchaeta, Artemisia arctica, Dicranum* sp., *Cladonia* spp. dwarf-shrub, fruticose-lichen tundra	Snowbed area on east-facing slope
SW-41	Dry *Cassiope tetragona, Salix chamissonis, Carex microchaeta, Hylocomium splendens, Cladonia* spp., *Cetraria* spp. dwarf-shrub, fruticose-lichen tundra	Snowbed area on east-facing slope
SW-42	Dry *Dryas octopetala, Salix phlebophylla, Cornicularia divergens, Alectoria ochroleuca* prostrate-shrub, fruticose-lichen tundra	Exposed sandstone outcrop
SW-43	Dry *Salix phlebophylla, Vaccinium vitis-idaea, Arctous alpina, Diapensia lapponica, Cetraria nivalis, Sphaerophorus globosus, Cetraria cucullata* prostrate-shrub, fruticose-lichen tundra	Dry till outcrop on ridge
SW-44a	Dry *Vaccinium vitis-idaea, Cassiope tetragona, Salix phlebophylla, Carex bigelowii, Dicranum elongatum, Cladonia rangiferina, Cetraria* spp., *Sphaerophorus globosus* dwarf-shrub, fruticose-lichen tundra	Dry portion of stone-stripe complex
SW-44b	Dry *Cassiope tetragona, Salix phlebophylla, Luzula arctica, Rhacomitrium lanuginosum* barren	Frost scar on stone stripe
SW-45	Moist *Carex bigelowii, Salix planifolia* ssp. *pulchra, Betula nana, Ledum palustre* ssp. *decumbens, Aulacomnium palustre, Sphagnum* spp. sedge, dwarf-shrub tundra	Moist part of stone-stripe complex

Table 1. List of vegetation communities and microsites sampled in 1984 and 1985

Plot No.	Plant Community	Microsite
SW-46	Moist *Betula nana, Rubus chamaemorus, Carex bigelowii, Hylocomium splendens, Sphagnum* spp. low-shrub, moss tundra	Footslope, inter-water-track
SW-47	Wet *Carex aquatilis, Salix chamissonis, S. fuscescens, Drepanocladus uncinatus, Aulacomnium palustre* sedge, dwarf-shrub tundra	Stream bank
SW-48	Moist *Betula nana, Carex bigelowii, Vaccinium vitis-idaea, Hylocomium splendens, Aulacomnium turgidum* low-shrub tundra	Footslope, inter-water-track
SW-49	Wet *Salix planifolia* ssp. *pulchra, Eriophorum angustifolium, Carex aquatilis, Drepanocladus uncinatus, Hylocomium splendens* low-shrub tundra	Well developed water-track
SW-50	Moist *Eriophorum vaginatum, Salix planifolia* ssp. *pulchra, Betula nana, Vaccinium vitis-idaea, Aulacomnium turgidum, Hylocomium splendens* tussock-sedge, dwarf-shrub tundra	Stable slope
SW-51	Dry *Vaccinium uliginosum, Arctous alpina, Cetraria cucullata, Cladonia* spp., *Stereocaulon tomentosum* dwarf-shrub, fruticose-lichen tundra	Snowbank on south-facing slope
SW-52	Dry *Dryas octopetala, Salix phlebophylla, Saxifraga nivalis, Smelowskia calycina, Artemisia arctica, Cetraria nivalis, Cladonia pyxidata* dwarf-shrub, fruticose-lichen tundra	Exposed sandstone outcrop, south-facing slope
SW-53	Dry *Dryas octopetala, Kobresia myosuroides, Anemone drummondii, Smelowskia calycina, Erigeron muirii, Thamnolia subuliformis, Cetraria* spp., *Cornicularia divergens* prostrate-shrub, forb, tundra	Exposed sandstone outcrop, south-facing slope
SW-54	Dry *Dryas octopetala, Oxytropis nigrescens, Thamnolia subuliformis, Cornicularia divergens* prostrate-shrub tundra	Very exposed site on sandstone ridge
SW-55	Moist *Cassiope tetragona, Vaccinium vitis-idaea, Salix phlebophylla, Hylocomium splendens, Aulacomnium turgidum, Cladonia* spp. dwarf-shrub, moss tundra	Hummocky deep snow-bed on north-facing slope
SW-56	Moist *Cassiope tetragona, Salix planifolia* ssp. *pulchra, Vaccinium vitis-idaea, Hylocomium splendens, Aulacomnium turgidum, Cladonia* spp., *Cetraria* spp. dwarf-shrub, moss tundra	Hummocky deep snow-bed on north-facing slope
SW-57	Dry *Cassiope tetragona, Vaccinium uliginosum, Novosieversia glacialis, Vaccinium vitis-idaea, Hylocomium splendens, Rhacomitrium lanuginosum, Cladonia* spp., *Cetraria* spp. dwarf-shrub, fruticose-lichen tundra	Well-drained north-facing snow-bed
SW-58a	Dry *Dryas octopetala, Cornicularia divergens, Asahinea chrysantha* prostrate-shrub tundra	Very exposed hill crest
SW-58b	Dry *Carex rupestris, Minuartia obtusiloba, Silene acaulis, Cornicularia divergens* barren	Frost-scar in exposed site
SW-59	Dry *Cassiope tetragona, Dryas integrifolia, Vaccinium uliginosum, Salix reticulata, Tomenthypnum nitens, Ptilidium ciliare, Dactylina arctica, Cetraria* spp., *Thamnolia subuliformis* dwarf-shrub, fruticose-lichen tundra	Hummocky snow-bed southwest facing
SW-60	Dry *Vaccinium uliginosum, Arctous alpina, Dryas octopetala, Rhytidium rugosum, Stereocaulon tomentosum, Cetraria cucullata* dwarf-shrub, fruticose-lichen tundra	South-facing snow-bed

Table 1. List of vegetation communities and microsites sampled in 1984 and 1985

Plot No.	Plant Community	Microsite
SW-61	Moist *Eriophorum vaginatum, Salix planifolia* ssp. *pulchra, Carex bigelowii, Aulacomnium turgidum, Hylocomium splendens* tussock-sedge, dwarf-shrub tundra	Gentle northwest-facing slope
SW-62	Moist *Eriophorum vaginatum, Salix planifolia* ssp. *pulchra, Betula nana, Ledum palustre* ssp. *decumbens, Aulacomium turgidum, Sphagnum* spp., *Hylocomium splendens* tussock-sedge, dwarf-shrub tundra	Stable level site
SW-63	Dry *Rhizocarpon geographicum, Xanthoparmelia separata, X. centrifuga, Cornicularia divergens, Umbilicaria* spp. lichen barren	Boulder field
SW-64	Dry *Xanthoparmelia centrifuga, Rhizocarpon* spp., *Lecidea* spp., *Umbilicaria* spp. lichen barren	Boulder field
SW-65	Aquatic *Sparganium hyperboreum* forb marsh	Beaded pond
SW-66	Aquatic *Sparganium hyperboreum* forb marsh	Beaded pond
SW-67	Moist *Betula nana, Ledum palustre* ssp. *decumbens, Rubus chamaemorus, Dicranum* sp., *Cladonia rangiferina* dwarf-shrub, moss, fruticose-lichen tundra	Palsa
SW-68	Moist *Calamagrostis canadensis, Salix chamissonis, Polemonium acutiflorum* grass tundra	Stream bank
SW-69	Dry *Luzula arctica, Juncus biglumis* barren	Frost scar
SW-70	Dry *Vaccinium vitis-idaea, Luzula arctica, Juncus biglumis* barren	Frost scar
SW-71	Dry *Juncus biglumis, Eriophorum vaginatum* barren	Frost scar
SW-72	Moist *Salix rotundifolia, Saxifraga rivularis, Saxifraga nelsoniana, Hypnum* sp., *Stereocaulon tomentosum* dwarf-shrub, moss tundra	Very late lying snow-bed
SW-73	Moist *Salix rotundifolia, Arnica lessingii, Carex microchaeta, Hypnum* sp. dwarf-shrub tundra	Very late lying snow-bed

Table 2. Summary of areas sampled in 1984 and 1985

Summary of areas sampled in 1984 and 1985. This list includes subplots (microsites sampled separately within a 10 m diameter circular plot).

Microsite	Plots	Number of Microsites
Water tracks	2,4a,5,7,11,34,49	7
Margins of water tracks	4b,10	2
Hill slopes between water tracks	1,3,8,12,13,17,45,48,50,61,62	11
Hill slopes with stone stripes, non-frost-scar areas	26,29a,30a,32a,44a	5
Frost-scars on stone stripes	29b,30b,32b,44,58b	5
Wet frost scars	69,70,71	3
Hill slopes, areas between stone stripes	27,31,46	3
Wet hill slopes with solifluction features, tops of solifluction hummocks	6,35a,36a	3
Wet hill slopes with solifluction features, areas between hummocks	35b,36b	2
Wet meadow with strangmoor, areas between hummocks	18,19,20,21a,22a,25b	6
Wet meadow with strangmoor, hummocks	21b,22b,25a	3
Palsas	24,67	2
Dry rocky till deposits	9,28,38,39,43	5
Dry sandstone outcrops	33,42,52,53,54,58a	6
Snowbeds	40,41,51,55,56,57,59,60,72,73	10
Stream Channel	16,23	2
Creek margin	14,15,47,68	4
Boulder field	63,64	2
Pond	37,65,66	3

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Table 3. Legend for the environmental variables used in the R4D vegetation studies

Landform
1 Hill crest
2 Sideslope
3 Footslope
4 Active floodplain
5 Stabilized floodplain
6 Alluvial fan
7 Glaciofluvial outwash
8 Stream bluff
9 Small streams and water tracks
10 Lake basin
11 Colluvial basin
12 Water
13 Disturbed

Terrain Unit
1 Bedrock
2 Till
3 Glaciofluvial outwash
4 Meander floodplain
5 Non-meander floodplain
6 Alluvial fan
7 Basin colluvium
8 Hillslope deposits (undifferentiated retransported deposits)
9 Emergent lake bottom
10 Pond or lake
11 Stream or river
12 Disturbed

Exposure Scale
1.0 Protected from winds
2.0 Moderate exposure to winds
3.0 Exposed to winds
4.0 Very exposed to winds

Surface Form
1 Blockfields and sorted stone stripes
2 Non-sorted stone stripes with frost scars
3 Hummocky terrain including turf hummocks
4 Gelifluction or solifluction features
5 High-centered polygons
6 Palsa
7 Frost scars
8 Strangmoor or aligned hummocks in bogs
9 Thermokarst pits
10 Weakly defined hillslope water tracks (<1.0 m relief)
11 Well defined hillslope water tracks (>1.0 m relief)
12 Incised stream drainage
13 Active floodplain alluvium
14 Irregular relief associated with stream drainages
15 Rocky terrain (undifferentiated till and bedrock)
16 Featureless ground
17 Pond complex
18 Water
19 Disturbed

Microsite
1 Hummock
2 Inter-hummock
3 Frost scar
4 Inter-frost scar
5 In water track
6 Shrubby edge of water track
7 Top of solifluction lobe
8 Inter-solifluction lobe

Site Moisture (modified from Komárková 1983)
1.0 Extremely xeric–almost no moisture; no plant growth
2.0 Very xeric–very little moisture; dry sand dunes
3.0 Xeric–little moisture; stabilized sand dunes, dry ridge tops
4.0 Subxeric–noticeable moisture; well-drained slopes, ridges
5.0 Subxeric to mesic–very noticeable moisture; flat to gently sloping
6.0 Mesic–moderate moisture; flat or shallow depressions
7.0 Mesic to subhygric–considerable moisture; depressions
8.0 Subhygric–very considerable moisture; saturated but with <5% standing water <10 cm deep
9.0 Hygric–much moisture; up to 100% of surface under water 10 to 50 cm deep; lake margins, shallow ponds, streams
10.0 Hydric–very much moisture; 100% of surface under water 50 to150 cm deep; lakes, streams

Estimated Snow Duration
1.0 Snow free all year
2.0 Snow free most of the winter; some snow cover persists after storms but is blown free soon afterward
3.0 Snow free prior to melt out but with snow most of winter
4.0 Snow free immediately after melt out
5.0 Snow bank persists 1-2 weeks after melt out
6.0 Snow bank persists 3-4 weeks after melt out
7.0 Snow bank persists 4-8 weeks after melt out
8.0 Snow bank persists 8-12 weeks after melt out
9.0 Very short snow free period
10.0 Deep snow all year

Stability
1.0 Stable
2.0 Subject to occasional disturbance
3.0 Subject to prolonged but slow disturbance such as solifluction
4.0 Annually disturbed
5.0 Disturbed more than once annually

Soil Type
Blank – no soil
1 Pergelic Cryaquoll
2 Pergelic Cryohemist
3 Pergelic Cryofibrist
4 Pergelic Cryorthent
5 Pergelic Cryumbrept
6 Pergelic Cryaquept
7 Histic Pergelic Cryaquept
8 Ruptic Pergelic Cryaquept
9 Hemic Pergelic Sphagnofibrist
0 Ranker soil (Pergelic Cryorthent)

Soil Moisture (from Komárková 1983)
1.0 Very dry–very little moisture; soil does not stick together
2.0 Dry–little moisture; soil somewhat sticks together
3.0 Damp–noticeable moisture; soil sticks together but crumbles
4.0 Damp to moist–very noticeable moisture; soil clumps
5.0 Moist–moderate moisture; soil binds but can be broken apart
6.0 Moist to wet–considerable moisture; soil binds and sticks to fingers
7.0 Wet–very considerable moisture; drops of water can be squeezed out of soil
8.0 Very wet–much moisture can be squeezed out of soil
9.0 Saturated–very much moisture; water drips out of soil
10.0 Very saturated–extreme moisture: soil is more liquid than solid

Animal and Human Disturbance
0.0 No sign present
1.0 Some sign present; no disturbance
2.0 Minor disturbance or extensive sign
3.0 Moderate disturbance; small dens or light grazing
4.0 Major disturbance; multiple dens or noticeable trampling
5.0 Very major disturbance; very extensive tunneling or large pit

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Date Sampled	Landform	Terrain Unit	Slope (0)	Aspect (0)	Exposure (Scalar)	Surface Form	Microsite	% Cover of Microsite	Site Moisture (Scalar)	Estimated Snow Duration (Scalar)	Snow Depth (cm, 5/17/87)*	Stability (Scalar)	Cryoturbation (%)	Height of Microrelief (cm)
SW01	8/1/84	2	8	5	260	2.0	16			7.0	5.0	46	3.0	0	20
SW02	8/1/84	2	8	7	260	2.0	10			9.0	1.5		4.0	0	22
SW03	8/3/84	2	8	7	260	2.0	16			7.0	4.5	41	1.5	0	26
SW04A	8/3/84	2	8	7	260	2.0	11	5	30	8.0	3.8	35	2.8	0	18
SW04B	8/3/84	2	8	7	260	2.0	11	6	70	7.5	4.0		2.0	0	
SW05	8/3/84	2	8	6	260	2.0	11			8.0	4.0	53	2.0	0	18
SW06	8/3/84	2	8	7	260	2.0	4			7.0	4.5	30	3.2	0	18
SW07	8/3/84	2	8	7	260	2.0	11			8.0	4.5	49	3.5	0	15
SW08	8/3/84	2	8	7	260	2.0	16			6.5	4.5	38	1.8	0	20
SW09	8/4/84	2	2	3	260	3.0	15			3.5	2.0	10	1.5	0.3	3
SW10	8/4/84	2	8	4	260	2.0	10			7.0	5.0		2.0	0	17
SW11	8/4/84	2	8	5	260	2.0	11			8.5	4.0	60	3.5	0	15
SW12	8/4/84	2	8	7	260	2.0	16			7.0	4.0	52	1.8	0	20
SW13	8/4/84	3	8	6	270	2.0	4			7.5	5.0	71	2.5	0	28
SW14	8/4/84	11	5	0		1.8	16			7.8	5.5	46	2.0	0	18
SW15	8/4/84	11	5	0		1.8	16			7.0	5.0	45	1.5	0	12
SW16	8/5/84	4	5	2	350	1.5	16			9.5	4.5		4.5	0	4
SW17	8/5/84	3	8	5	270	2.0	16			7.0	5.5	50	1.5	0	18
SW18	8/5/84	4	7	1	350	1.5	8			9.0	5.5	70	4.0	0	12
SW19	8/5/84	5	7	3	300	2.0	16			7.5	5.5	41	1.5	0	12
SW20	8/5/84	11	7	3	280	1.8	16			8.0	5.0		1.5	0	12
SW21A	8/5/84	11	7	0		1.8	8	2	92	8.0	4.0	53	2.0	0	0
SW21B	8/5/84	11	7	0		1.8	8	1	8	6.0	3.0		2.5	0	20
SW22A	8/5/84	11	7	1	350	1.8	8	2	80	8.0	4.0		1.5	0	0
SW22B	8/5/84	11	7	1	350	1.8	8	1	20	7.0	3.5		1.8	0	15
SW23	8/5/84	4	5	0		1.5	16			10.0	4.5		4.3	0	3
SW24	8/6/84	11	7	0		2.0	6			5.0	3.5	30	2.0	0	22
SW25A	8/6/84	11	7	1	300	1.8	8	1	50	7.0	3.8		2.0	0	15

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Date Sampled	Landform	Terrain Unit	Slope (0)	Aspect (0)	Exposure (Scalar)	Surface Form	Microsite	% Cover of Microsite	Site Moisture (Scalar)	Estimated Snow Duration (Scalar)	Snow Depth (cm, 5/17/87)*	Stability (Scalar)	Cryoturbation (%)	Height of Microrelief (cm)
SW25B	8/6/84	11	7	1	300	1.8	8	2	50	9.0	4.0		1.0	0	0
SW26	8/6/84	1	8	4	80	3.0	2			4.5	3.0	50	3.0	1	15
SW27	8/6/84	1	8	3	80	3.0	16			6.0	3.0	63	3.0	0	20
SW28	8/6/84	1	2	0		3.5	15			3.0	2.0	8	2.0	0	3
SW29A	8/6/84	1	2	2	70	2.5	2	4	75	6.0	3.0		1.5	0	10
SW29B	8/6/84	1	2	2	70	2.5	2	3	25	4.0	3.0		5.0	25	10
SW30A	8/7/84	1	2	1	90	3.0	2	4	80	4.0	3.0	32	2.0	0.3	12
SW30B	8/7/84	1	2	1	90	3.0	2	3	20	3.5	3.0		5.0	20	12
SW31	8/7/84	1	2	2	90	2.9	16			6.0	4.0	56	1.8	0	15
SW32A	8/7/84	1	2	2	90	2.8	2	4	75	4.0	4.5	38	1.5	0	10
SW32B	8/7/84	1	2	2	90	2.8	2	3	25	3.0	4.5		5.0	99	2
SW33	8/7/84	2	2	15	120	3.7	15			3.0	2.0	0	1.5	0	2
SW34	8/7/84	2	8	7	90	1.5	11			8.0	5.0	71	3.5	0	10
SW35A	8/7/84	2	8	8	90	1.5	4	7	70	7.0	5.0	80	3.0	0	28
SW35B	8/7/84	2	8	8	90	1.5	4	8	30	8.0	5.0		3.0	0	28
SW36A	8/7/84	2	8	7	90	1.5	4	7	60	6.0	5.5		3.0	0	22
SW36B	8/7/84	2	8	7	90	1.5	4	8	40	8.0	5.5		3.0	0	22
SW37	8/7/84	12	10	0		1.0	18			10.0	4.0		5.0	0	3
SW38	8/8/84	1	2	4	225	3.5	15			4.0	2.5	82	1.2	0	8
SW39	8/8/84	1	2	2	220	3.3	7			4.0	2.5	25	1.5	0	8
SW40	8/8/84	2	2	8	80	1.5	15			5.0	6.0		1.5	0	8
SW41	8/8/84	2	2	5	70	1.5	15			6.0	6.0	82	2.0	0	12
SW42	8/19/85	2	2	5	180	3.8	15			3.0	2.0	13	1.5	5	15
SW43	8/21/85	1	2	0		3.0	15			4.0	2.5	34	1.0	1	10
SW44A	8/21/85	2	2	3	270	2.5	2	4	90	4.5	3.0		2.0	10	15
SW44B	8/21/85	2	2	3	270	2.5	2	3	10	3.5	3.0		5.0	99	2
SW45	8/21/85	2	2	2	270	2.5	16			7.0	3.5		2.5	0	20
SW46	8/23/85	3	8	4	68	1.5	16			7.0	5.0	54	2.8	0	15
SW47	8/23/85	4	5	1	360	1.5	16			8.0	5.0	77	4.0	0	15

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Date Sampled	Landform	Terrain Unit	Slope (0)	Aspect (0)	Exposure (Scalar)	Surface Form	Microsite	% Cover of Microsite	Site Moisture (Scalar)	Estimated Snow Duration (Scalar)	Snow Depth (cm, 5/17/87)*	Stability (Scalar)	Cryoturbation (%)	Height of Microrelief (cm)
SW48	8/23/85	3	8	6	315	1.8	16			7.0	5.0	40	2.5	0	10
SW49	8/23/85	2	5	6	338	1.5	11			9.0	4.0	66	4.0	0	15
SW50	8/23/85	2	8	6	270	2.0	16			6.5	4.0		1.5	0	20
SW51	8/24/85	3	8	20	315	2.0	16			4.0	6.0	16	2.3	0	7
SW52	8/24/85	2	1	30	200	3.7	16			3.0	2.0	0	2.5	0	5
SW53	8/24/85	2	1	20	225	3.5	16			3.0	1.5	0	3.5	0	3
SW54	8/24/85	1	1	15	270	4.0	16			3.0	1.0	1	4.0	0	3
SW55	8/24/85	2	1	25	338	2.0	3			5.0	7.0		2.5	0	20
SW56	8/25/85	2	1	35	360	2.5	3			4.0	7.1	76	1.5	0	20
SW57	8/25/85	2	1	20	360	2.5	3			4.0	6.0	67	1.5	0	10
SW58A	8/25/85	1	1	2	180	4.0	7			2.0	1.0	5	4.0	0	2
SW58B	8/25/85	1	1	2	180	4.0	7			2.0	1.0		4.0	0	2
SW59	8/25/85	2	8	10	225	2.0	16			5.0	5.5	87	1.5	0	10
SW60	8/26/85	2	8	25	180	2.5	16			4.0	5.0	34	1.5	0	15
SW61	8/26/85	2	8	10	270	2.0	16			6.5	4.0	75	1.2	0	20
SW62	8/26/85	2	8	2	315	2.0	16			7.0	4.0	29	1.0	0	20
SW63	8/26/85	1	2	2	90	2.0	1			1.5	4.0		1.0	0	25
SW64	8/27/85	1	2	0		2.0	1			1.5	3.5	33	1.0	0	50
SW65	8/26/85	12	10	0		1.0	18			10.0	4.0	43	2.0	0	
SW66	8/27/85	4	10	0		1.0	18			10.0	4.0		4.0	0	10
SW67	8/29/85	11	7	0		2.0	5			5.0	4.0		1.0	0	15
SW68	8/29/85	4	5	2	90	1.5	16			5.0	5.0		4.0	0	10
SW69	8/30/85	1	8	0		2.0	7			6.5	4.0		5.0	99	5
SW70	8/30/85	1	8	0		2.0	7			6.0	4.0		5.0	99	5
SW71	8/31/85	2	8	2	90	2.0	7			7.0	4.5		5.0	90	10
SW72	9/1/85	2	1	30	350	1.5	3			4.0	7.3	122	1.5	0	25
SW73	9/1/85	3	8	5	25	1.5	16			6.0	7.3	137	2.0	0	5

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Tussock Thaw Depth (cm)	Inter-tussock Thaw Depth (cm)	Bare Soil (%)	Rock Cover (%)	Soil Type	Soil Mois-ture	Low Shrub Cover (%)	Dwarf Shrub Cover (%)	Average Shrub Height (cm)	Tussock Grami-noid Cover (%)	Non-tussock Grami-noid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryo-phyte Cover (%)	Horse-tail Cover (%)
SW01	35	22	0.0	0.0	7	8.0	5.0	35.0		2.0	18.0	0.0	0.3	80.0	0.0
SW02	45	42	0.0	0.0	2	9.0	35.0	1.0	35	0.0	35.0	0.3	0.3	55.0	1.0
SW03	46	22	0.0	0.0	7	8.0	1.0	30.0		45.0	7.0	0.3	2.0	75.0	0.0
SW04A	64	48	2.0	0.0	6	9.0	8.0	15.0		40.0	11.0	3.0	0.3	60.0	0.0
SW04B			0.0	0.0	7		50.0	50.0	25	0.0	25.0	6.0	1.0	70.0	0.0
SW05			2.0	0.0	6	8.0	55.0	20.0	25	0.3	15.0	1.0	3.0	70.0	0.0
SW06	43	20	0.0	0.0	7	7.2	20.0	30.0	18	0.3	30.0	2.0	4.0	85.0	0.0
SW07	59	43	0.0	0.0	6	8.0	45.0	40.0	40	15.0	15.0	3.0	0.3	80.0	0.0
SW08	48	32	0.0	0.0	6	7.5	5.0	35.0	28	5.0	30.0	5.0	10.0	70.0	0.0
SW09	99		2.0	5.0	4	3.0	0.0	50.0	3	0.0	5.0	1.0	50.0	15.0	0.0
SW10	36	20	0.0	0.0	6	7.0	40.0	20.0	25	0.3	15.0	7.0	1.0	90.0	0.0
SW11		49	30.0	0.0	6	9.0	15.0	10.0	40	0.0	35.0	3.0	0.0	15.0	0.0
SW12	49	22	0.0	0.0	6	8.0	15.0	50.0	25	10.0	30.0	1.0	1.0	70.0	0.0
SW13	39	18	0.0	0.0	7	7.3	35.0	25.0	28	5.0	25.0	1.0	1.0	75.0	0.0
SW14	40	25	0.0	0.0	9	8.0	0.0	20.0	8	0.0	25.0	3.0	0.3	95.0	0.0
SW15	33	23	0.0	0.0	2	8.0	0.0	60.0	12	0.3	4.0	0.3	0.3	100.0	0.0
SW16		67	20.0	0.0	3	10.0	0.0	0.0		0.0	90.0	0.0	0.0	0.3	0.0
SW17	33	19	0.0	0.0	7	7.0	1.0	50.0	12	15.0	0.3	0.3	1.0	100.0	0.0
SW18	60	45	2.0	0.0	7	9.0	0.3	25.0	22	0.0	60.0	2.0	0.0	25.0	0.0
SW19	39	28	0.0	0.0	7	8.0	0.3	25.0	12	0.0	20.0	0.3	0.3	100.0	0.0
SW20	35	23	0.0	0.0	7	8.5	0.0	30.0	12	0.0	20.0	0.3	0.3	100.0	0.0
SW21A		44	10.0	0.0	7	8.5	0.0	0.3	2	0.0	30.0	0.3	0.0	20.0	0.0
SW21B	53		0.0	0.0	7	7.0	1.0	1.0	5	0.0	1.0	0.3	1.0	3.0	0.0
SW22A		41	15.0	0.0	2	8.0	0.0	5.0	5	0.0	20.0	2.0	0.0	60.0	0.0
SW22B	57		0.0	0.0	7		0.3	10.0	5	0.0	10.0	1.0	0.0	20.0	0.0
SW23		46	30.0	0.0	3	10.0	0.0	0.0		0.0	60.0	0.3	0.0	10.0	0.0
SW24	40	21	0.0	1.0	9	6.0	0.3	50.0	12	20.0	0.3	0.3	40.0	65.0	0.0
SW25A	52		0.0	0.0	0	7.0	0.3	30.0	8	0.0	30.0	1.0	0.3	45.0	0.0
SW25B		36	3.0	0.0	2	8.0	0.0	0.3		0.0	15.0	1.0	0.0	20.0	0.0

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Tussock Thaw Depth (cm)	Inter-tussock Thaw Depth (cm)	Bare Soil (%)	Rock Cover (%)	Soil Type	Soil Mois-ture	Low Shrub Cover (%)	Dwarf Shrub Cover (%)	Average Shrub Height (cm)	Tussock Grami-noid Cover (%)	Non-tussock Grami-noid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryo-phyte Cover (%)	Horse-tail Cover (%)
SW26		99	1.0	3.0	5	4.0	0.0	35.0	5	0.0	10.0	2.0	50.0	50.0	0.3
SW27		95	0.0	0.0	1	6.0	5.0	30.0	10	0.3	35.0	3.0	2.0	60.0	0.0
SW28			3.0	20.0	5	3.0	0.0	40.0	1	0.0	0.3	0.3	55.0	5.0	0.0
SW29A		50	0.0	0.3	6	5.0	0.0	40.0	8	0.0	10.0	2.0	60.0	55.0	0.0
SW29B		90	10.0	15.0	8	4.0	0.0	0.3	5	0.0	0.3	1.0	1.0	0.3	0.0
SW30A		70	0.0	0.3	6	5.0	0.3	40.0	8	0.0	10.0	4.0	45.0	40.0	0.0
SW30B		80	10.0	10.0	8	4.0	0.0	0.3	5	0.0	0.3	0.3	1.0	1.0	0.0
SW31		60	0.0	0.0	6	6.0	20.0	30.0		0.3	30.0	20.0	1.0	80.0	0.0
SW32A		95	0.0	2.0	6	5.0	0.3	50.0	8	0.0	5.0	0.3	35.0	40.0	0.0
SW32B		100	13.0	12.0	8	4.0	0.0	0.3	3	0.0	0.3	0.3	0.3	0.3	0.0
SW33			10.0	30.0	4	2.0	0.0	50.0	3	0.0	5.0	0.3	40.0	3.0	0.0
SW34		61	5.0	0.0	7	9.0	35.0	0.3	40	0.0	60.0	20.0	0.0	45.0	0.0
SW35A	56		0.0	0.0	7	6.0	40.0	5.0	30	0.3	20.0	10.0	0.3	60.0	0.0
SW35B		47	5.0	0.0	7	9.0	5.0	5.0	30	0.0	20.0	0.3	0.0	30.0	0.0
SW36A	68		0.0	0.0	7	6.0	40.0	3.0	45	0.0	22.0	5.0	0.0	45.0	0.0
SW36B		49	5.0	0.0		8.5	25.0	0.3		0.0	25.0	0.3	0.0	25.0	0.0
SW37		55	20.0	0.0	3	10.0	0.0	0.0		0.0	0.0	50.0	0.0	20.0	5.0
SW38		100	0.0	20.0	5	4.0	0.0	60.0	2	0.0	1.0	0.3	60.0	15.0	0.0
SW39		100	0.0	10.0	5	4.5	0.0	35.0	3	0.0	20.0	2.0	60.0	20.0	0.0
SW40		65	0.0	10.0	5	4.0	0.0	50.0	6	0.0	15.0	5.0	70.0	55.0	0.0
SW41			0.0	2.0	5	5.0	0.0	85.0	10	0.0	5.0	5.0	45.0	50.0	0.0
SW42			1.0	15.0	5	3.5	0.0	55.0		0.0	1.0	1.0	48.0	5.0	0.0
SW43			1.0	3.0	5	3.0	0.0	35.0		0.0	1.0	0.0	45.0	7.0	0.0
SW44A			1.0	2.0	6	6.0	0.0	67.0		0.0	10.0	1.0	50.0	45.0	0.0
SW44B			40.0	50.0	6		0.0	8.0		0.0	2.0	0.7	1.0	9.0	0.0
SW45	55	42	0.0	0.0	7	7.0	20.0	40.0		10.0	30.0	1.0	8.0	90.0	0.0
SW46	32	22	0.0	0.0	7	7.0	65.0	35.0		0.3	15.0	0.3	0.3	100.0	0.0
SW47	61	40	5.0	0.0	6	9.0	0.3	35.0		0.0	45.0	2.0	0.0	75.0	0.0
SW48	33	21	0.0	0.0	6	6.0	65.0	10.0		0.0	35.0	1.0	1.0	100.0	0.0

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Tussock Thaw Depth (cm)	Inter-tussock Thaw Depth (cm)	Bare Soil (%)	Rock Cover (%)	Soil Type	Soil Mois-ture	Low Shrub Cover (%)	Dwarf Shrub Cover (%)	Average Shrub Height (cm)	Tussock Grami-noid Cover (%)	Non-tussock Grami-noid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryo-phyte Cover (%)	Horse-tail Cover (%)
SW49	52	42	7.0	0.0	6	9.0	55.0	5.0		0.0	35.0	1.0	0.0	85.0	0.0
SW50	47	34	0.0	0.0	6	7.0	0.0	30.0		40.0	10.0	2.0	5.0	60.0	0.0
SW51			1.0	0.3	5	3.0	0.0	75.0		0.0	1.0	0.3	60.0	25.0	0.0
SW52			10.0	1.0	5	2.0	0.0	50.0		0.0	1.0	10.0	25.0	13.0	0.0
SW53			35.0	50.0	5	3.0	0.0	35.0		0.0	1.0	5.0	20.0	3.0	0.0
SW54			5.0	65.0	5	2.0	0.0	40.0		0.0	1.0	4.0	10.0	1.0	0.0
SW55			0.0	0.3	0	5.0	0.0	80.0		0.0	3.0	5.0	40.0	90.0	0.0
SW56			0.0	0.3	5	5.0	5.0	60.0		0.0	3.0	2.0	10.0	100.0	0.0
SW57			0.3	0.3	5	6.0	0.0	65.0		0.0	1.0	10.0	45.0	85.0	0.0
SW58A			20.0	40.0	5	2.0	0.0	70.0		0.0	0.7	2.0	43.0	0.7	0.0
SW58B			0.0	95.0	6		0.0	0.0		0.0	0.3	1.0	10.0	0.0	0.0
SW59			1.0	0.3	1	6.0	0.0	80.0		0.0	5.0	10.0	30.0	25.0	0.7
SW60			0.3	0.3	5	2.0	0.0	70.0		0.0	3.0	2.0	30.0	35.0	0.0
SW61	43	23	0.0	0.0	7	6.5	5.0	35.0		45.0	10.0	2.0	1.0	65.0	0.0
SW62	42	26	0.0	0.0	7	6.5	5.0	20.0		45.0	10.0	2.0	1.0	75.0	0.0
SW63			0.0	95.0			0.0	0.0		0.0	0.1	0.0	80.0	15.0	0.0
SW64			0.0	95.0			0.0	0.3		0.0	0.3	0.3	75.0	3.0	0.0
SW65		30	30.0	0.0			0.0	0.0		0.0	0.0	40.0	0.0	0.3	0.0
SW66			10.0	0.0			0.0	0.0		0.0	0.0	70.0	0.0	0.0	0.0
SW67			0.0	0.0	9		5.0	70.0		3.0	0.0	0.0	50.0	90.0	0.0
SW68			0.0	0.0	6		0.0	20.0		0.0	75.0	5.0	0.0	40.0	0.0
SW69			98.0	0.0	6		0.0	0.3		0.0	2.0	0.3	0.3	0.0	0.0
SW70			99.0	0.0	6		0.0	0.3		0.0	0.3	0.3	0.7	0.0	0.0
SW71			90.0	0.0	6		0.0	0.0		5.0	7.0	0.0	0.0	0.0	0.0
SW72			0.0	50.0	0		0.0	30.0		0.0	0.7	2.0	10.0	60.0	0.0
SW73			5.0	20.0	6		0.0	70.0		0.0	7.0	6.0	5.0	30.0	1.0

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Disturbance:								
	Human	Fox	Bear	Caribou	Squirrel	Lemming or Vole	Moose	Bird	Insect
SW01	0	0	0	0	0	0	0	0	0
SW02	0	0	0	2.0	0	0	0	0	2.0
SW03	0	0	0	0	0	0	0	0	1.0
SW04A	0	0	0	0	0	0	0	0	2.0
SW04B	0	0	0	0	0	0	0	0	2.0
SW05	0	0	0	0	0	0	0	0	0
SW06	0	0	0	0	0	0	0	0	0
SW07	0	0	0	0	0	0	0	0	1.0
SW08	0	0	0	0	0	0	0	0	1.0
SW09	0	0	0	1.0	0	0	0	1.0	1.0
SW10	0	0	0	0	0	0	0	0	1.0
SW11	0	0	0	0	0	0	0	0	1.0
SW12	0	0	0	0	0	0	0	0	2.0
SW13	0	0	0	0	0	0	0	0	0
SW14	0	0	0	0	0	0	0	0	0
SW15	0	0	0	0	0	0	0	0	0
SW16	0	0	0	0	0	0	0	0	0
SW17	0	0	0	0	0	3.0	1.0	0	0
SW18	0	0	0	1.0	0	3.0	0	0	1.0
SW19	0	0	0	2.0	0	0	0	0	1.0
SW20	0	0	0	2.0	0	1.0	0	0	1.0
SW21A	0	0	0	1.0	0	0	0	0	0
SW21B	0	0	0	1.0	0	0	0	0	0
SW22A	0	0	0	2.0	0	0	0	0	0
SW22B	0	0	0	2.0	0	1.0	0	0	0
SW23	0	0	0	0	0	0	0	0	0
SW24	0	0	0	0	0	0	0	1.0	0
SW25A	0	0	0	0	0	0	0	0	0
SW25B	0	0	0	1.0	0	0	0	0	0
SW26	0	0	0	0	0	0	0	1.0	0
SW27	0	0	0	0	0	0	0	0	1.0

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Disturbance:								
	Human	Fox	Bear	Caribou	Squirrel	Lemming or Vole	Moose	Bird	Insect
SW28	0	0	0	1.0	0	0	0	0	0
SW29A	0	0	0	1.0	0	0	0	0	0
SW29B	0	0	0	1.0	0	0	0	0	0
SW30A	0	0	0	1.0	0	0	0	0	1.0
SW30B	0	0	0	1.0	0	0	0	0	0
SW31	0	0	0	0	0	0	0	0	1.0
SW32A	0	0	0	1.0	0	0	0	0	1.0
SW32B	0	0	0	1.0	0	0	0	0	0
SW33	1.0	0	0	1.0	1.0	0	0	0	0
SW34	0	0	0	0	0	0	0	0	1.0
SW35A	0	0	0	1.0	0	0	0	0	1.0
SW35B	0	0	0	0	0	1.0	0	0	0
SW36A	0	0	0	1.0	0	0	0	0	1.0
SW36B	0	0	0	1.0	0	0	0	0	1.0
SW37	0	0	0	0	0	0	0	0	0
SW38	0	0	0	1.0	0	0	0	0	0
SW39	0	0	0	1.0	0	0	0	0	0
SW40	0	0	0	0	0	0	0	0	1.0
SW41	0	0	0	0	0	0	0	1.0	0
SW42	0	0	0	1.0	0	0	0	0	0
SW43	0	0	0	0	0	0	0	0	0
SW44A	0	0	0	0	0	0	0	0	0
SW44B	0	0	0	0	0	0	0	0	0
SW45	0	0	0	0	0	0	0	0	0
SW46	0	0	0	1.0	0	0	0	0	0
SW47	0	0	0	0	0	0	0	0	1.0
SW48	0	0	0	0	0	0	0	0	0
SW49	0	0	0	0	0	0	0	0	2.0
SW50	0	0	0	0	0	0	0	0	0
SW51	0	0	0	1.0	0	0	0	0	0
SW52	0	0	1.0	1.0	1.0	0	0	0	0

Table 4. Environmental variables for the R4D permanent vegetation plots

Plot	Disturbance:								
	Human	Fox	Bear	Caribou	Squirrel	Lemming or Vole	Moose	Bird	Insect
SW53	0	0	0	1.0	0	0	0	0	0
SW54	0	0	0	1.0	0	0	0	0	0
SW55	0	0	0	0	0	2.0	0	0	0
SW56	0	0	0	0	0	3.0	0	0	0
SW57	0	0	0	1.0	0	0	0	1.0	0
SW58A	0	0	0	0	0	0	0	0	0
SW58B	0	0	0	0	0	0	0	0	0
SW59	0	0	0	1.0	0	0	0	0	0
SW60	0	0	0	1.0	0	1.0	0	0	0
SW61	0	0	0	1.0	0	0	0	0	0
SW62	0	0	0	0	0	0	0	0	0
SW63	0	0	0	0	1.0	0	0	0	0
SW64	0	0	0	0	0	0	0	1.0	0
SW65	0	0	0	0	0	0	0	0	0
SW66	0	0	0	0	0	0	0	0	0
SW67	0	0	0	1.0	0	0	0	0	0
SW68	0	0	0	0	0	0	0	0	0
SW69	0	0	0	0	0	0	0	0	0
SW70	0	0	0	0	0	0	0	0	0
SW71	0	0	0	0	0	0	0	0	0
SW72	0	0	0	0	0	3.0	0	0	0
SW73	0	0	0	0	0	3.0	0	0	0

Table 5. Soil Descriptions for Representative Vegetation Communities

(Colors are for wet soils (field conditions) unless otherwise stated)

Plot No. SW-2

MICROSITE:	Well developed water track, lower-midslope portion of track; soil pit is in the center of the track.
SUBSTRATE:	Organic-rich alluvium over clay-rich till
VEGETATION:	Wet *Salix planifolia* ssp. *pulchra*, *Eriophorum angustifolium*, *Drepanocladus uncinatus* low-shrub, sedge tundra.
CLASSIFICATION:	Histic Pergelic Cryaquept
NOTES:	Permafrost at 46 cm. Buried soil at 19 cm probably due to fluvial deposition from water track.
IOe	0-10 cm. Reddish black (2.5Y 2/1.5) coarse hemic peat with silty clay mineral component, est. 75% by volume; abrupt smooth boundary.
IA	10-19 cm. Yellowish grey (2.5Y 4/1) organic loam; weak subangular blocky, breaking to weak fine granular; many fine and very fine roots; abrupt smooth boundary.
IIOeb	19-32 cm. Black (10YR 2/2) silty clay hemic peat composed of sedge leaves and roots; moderate medium platy structure due to compressed plant material; abrupt smooth boundary.
IIBAb	32-46+ cm. Yellowish grey (2.5Y 4/1) gravelly clay loam with few prominent medium irregularly shaped brown (10YR 4/6) mottles; no detectable structure due to wetness; 30-40% coarse gravel to 5 cm diameter; no roots.

Plot No. SW-6

MICROSITE:	Interfluve between water tracks, weakly developed solifluction features about middle of backslope.
SUBSTRATE:	Clay-rich Sagavanirktok-age till
VEGETATION:	Moist *Carex bigelowii*, *Betula nana*, *Salix planifolia* spp. *pulchra*, *Ledum palustre* ssp. *decumbens*, *Hylocomium splendens*, *Sphagnum* spp. sedge, dwarf-shrub tundra
CLASSIFICATION:	Histic Pergelic Cryaquept
NOTES:	Permafrost at 30 cm. Oxidized mineral layer at base of peat.
Oi	0-8 cm. Bright yellow brown (10YR 6/6) loose fibric peat composed of live moss (*Sphagnum* and *Hylocomium*), moss bases and other plant roots; clear smooth boundary.
Oe	8-13 cm. Black (7.5YR 1.7/1) hemic peat; moderate medium platy structure; 10-15% mineral, mostly clay; many fine and very fine roots; abrupt smooth boundary.
A	13-15 cm. Brown (7.5YR 4/3) organic sandy clay loam; weak medium platy structure breaking to weak fine granular; noticeable increase in clay toward base of organics; slightly sticky, slightly plastic (wet); many fine and very fine roots common medium; roots abrupt smooth boundary.
Bw	15-30+ cm. Greyish yellow brown (10YR 4/2) clay loam with prominent medium to large irregularly shaped brown (10YR 4/6) mottles concentrated along root channels, plant material and areas of somewhat sandier soil; bright brown (7.5YR 5/6) oxidized band 1-2 cm thick at top of horizon beneath overlying peat; moderate medium angular blocky structure; 5-10% fine gravel, less than 1 cm diameter; sticky, plastic (wet); many fine and very fine roots.

Plot No. SW-8

MICROSITE:	Interfluve between water tracks, about midslope
SUBSTRATE:	Clay-rich Sagavanirktok-age till
VEGETATION:	Moist *Carex bigelowii*, *Betula nana*, *Ledum palustre* ssp. *decumbens*, *Sphagnum* spp. sedge, dwarf-shrub tundra
CLASSIFICATION:	Pergelic Cryaquept
NOTES:	Permafrost at 40 cm
Oe	0-9 cm. Black (5YR 1.7/1) coarse hemic peat; many fine and very fine roots, common medium roots; abrupt smooth boundary.

Table 5. Soil Descriptions for Representative Vegetation Communities

Bw	9-40+ cm. Dull brown (7.5 5/4) gravelly sandy clay loam; moderate medium subangular blocky structure, breaking to moderate fine granular; est. 20% gravel <2.5 cm diameter; plastic, sticky (wet); many fine and very fine roots.

Plot No. SW-11

MICROSITE:	Well developed water track, middle of track, midway downslope
SUBSTRATE:	Organic-rich slope wash over clay-rich till
VEGETATION:	Wet *Salix planifolia* spp. *pulchra*, *Eriophorum angustifolium*, *Carex bigelowii*, *Sphagnum* spp. low-shrub tundra (soil pit is in area of *Eriophorum angustifolium*)
CLASSIFICATION:	Pergelic Cryaquept
NOTES:	Permafrost at 55 cm
Oe	0-5 cm. Very dark reddish brown (5YR 2/2.5) coarse hemic peat; abrupt smooth boundary,
Oa	5-10 cm. Very dark brown (7.5YR 2/3) silty clay sapric organic; weak medium platy structure due to compressed vegetation mat (mostly sedge leaves); nonsticky, non plastic (wet); many fine and very fine roots, common medium roots; abrupt smooth boundary.
Bw	10-50+ cm. Dull yellowish brown (10YR 4/3) clay with prominent large and medium irregularly-shaped yellowish brown (10YR 5/5) mottles; moderate angular blocky structure; very sticky, very plastic (wet); <2% fine gravel; many fine and very fine roots.

Plot No. SW-16

MICROSITE:	Stream channel
SUBSTRATE:	Organic rich alluvium from colluvial basin
VEGETATION:	Aquatic *Carex aquatilis*, *Eriophorum angustifolium* sedge tundra
CLASSIFICATION:	Pergelic Cryofibrist
NOTES:	Permafrost at 72 cm. Soil has deep mat of organic material with large amount of included sandy alluvium.
Oi1	0-10 cm. Very dark reddish brown (5YR 2/4) loose sandy loamy fibric peat composed of roots and sedge leaves; many fine and very fine live roots; gradual smooth boundary.
Oi2	10-20 cm. Very dark brown (7.5YR 2/3) compressed sandy loamy fibric peat composed of roots and sedge leaves; many fine and very fine roots; gradual smooth boundary.
Oi3	20-40+ cm. Brownish black (10YR 2/3) compacted sandy loam peat.

Plot No. SW-19

MICROSITE:	*Sphagnum*-rich sedge meadow on margin of colluvial basin
SUBSTRATE:	Organic-rich basin deposit
VEGETATION:	Wet *Eriophorum scheuchzeri*, *Salix fuscescens*, *Sphagnum lenense* sedge, dwarf-shrub, moss tundra
CLASSIFICATION:	Histic Pergelic Cryaquept
NOTES:	Permafrost at 28 cm
Oi	0-4 cm. Yellowish brown (10YR 5/6) loose *Sphagnum* mat; abrupt smooth boundary.
Oe	4-20 cm. Brownish black (5YR 2/2) compressed hemic peat composed of sedge leaves and *Sphagnum*; small amount of clay; many fine and very fine roots; clear smooth boundary.
Oa	20-25 cm. Brownish black (7.5YR 3/2) sapric peat; moderate medium platy structure due to compressed plant material, est. <5% mineral by volume, very sticky, very plastic (wet); many fine and very fine roots; abrupt smooth boundary.
Bw	25-28 cm. Brown (10YR 4/4) clay; massive, very sticky, very plastic; few roots.

Plot No. SW-22A

MICROSITE:	Bog in colluvial basin, inter-hummock site
SUBSTRATE:	Organic-rich basin deposit
VEGETATION:	Wet *Carex rariflora*, *C. rotundata*, *Eriophorum scheuchzeri*, *Sphagnum lindbergii* sedge tundra
CLASSIFICATION:	Pergelic Cryohemist
NOTES:	Permafrost at 48 cm. Discontinuity (and water table) at 37 cm, possibly overlie a buried peat

Table 5. Soil Descriptions for Representative Vegetation Communities

IOi1	0-3 cm. Brownish black (5YR 2/2) loose organic mat composed of *Sphagnum* and sedge roots; est. 5% by volume; very dark reddish brown (5YR 3/2) clay component; only slightly sticky and slightly plastic due to large amount of organic; clear smooth boundary.
IOi2	3-18 cm. Dark brown (7.5YR 3/3) compressed hemic peat with silty clay loam mineral component (est. 5% by volume); nonsticky, nonplastic; many fine and very fine roots; clear smooth boundary.
IOe1	18-33 cm. Very dark brown (7.5YR 2.5/3) fibric peat with many yellowish sedge roots, clear smooth boundary.
IOe2	33-73 cm. Very dark brown (7.5YR 2/3) more compressed fibric peat; est. 10% by volume silty clay loam; slightly sticky, slightly plastic; many fine and very fine roots; abrupt smooth boundary.
IIOab(?)	37-48+ cm. Very dark brown (7.5 2/3) sapric peat; est. 20% by volume loam; extremely wet; moderate medium subangular blocky breaking to weak medium granular structure; few fine roots

Plot No. SW-24

MICROSITE:	Palsa in colluvial basin
SUBSTRATE:	Organic-rich basin deposit
VEGETATION:	Moist *Betula nana*, *Rubus chamaemorus*, *Ledum palustre* spp. *decumbens*, *Dicranum elongatum*, *Sphagnum* spp., *Cladonia* spp. dwarf-shrub, fruticose-lichen tundra
CLASSIFICATION:	Hemic Pergelic Sphagnofibrist; Classification based on assumption that there is no mineral horizon within 10 cm below permafrost table
NOTES:	Permafrost at 39 cm. Water table at 38.
Oi	0-15 cm. Bright reddish brown to yellow orange (5YR 5/8 to 10YR 8/4) very porous loose fibric peat composed of *Sphagnum* bases; clear smooth boundary.
Oe	15-32 cm. Brownish black (5YR 2/2) compressed hemic *Sphagnum* peat; est. less than 2% loamy mineral material; moderate medium platy structure; many fine and very fine roots; abrupt smooth boundary.
Oa	32-39+ cm. Very dark brown (7.5 YR 2/3) sapric *Sphagnum* peat; est. 10% silt loam mineral material by volume; moderate medium granular structure; slightly sticky, slightly plastic (wet); many fine and very fine roots binding the soil, common fine roots below water table at 38 cm.

Plot No. SW-32

MICROSITE:	Nonsorted stone stripe on east side of west ridge near the crest of the slope. Stripes are 3-5 m wide with frost scars spaced 1.5-2.5 m apart.
SUBSTRATE:	Clay-rich glacial till
VEGETATION:	Dry *Cassiope tetragona*, *Vaccinium uliginosum*, *Carex bigelowii*, *Tortula ruralis*, *Dicranum elongatum*, *Cetraria nivalis*, *Cladonia* spp. dwarf-shrub, fruticose-lichen tundra
CLASSIFICATION:	Ruptic Pergelic Cryaquept
Inter-frost-scar element	
NOTES:	Permafrost at 95 cm. Horizons contorted due to cryoturbation. Colors are for moist soil.
O	0-2 cm. Loose mosses, lichens and dead plant material.
A	2-6 cm. Dark brown (7.5YR 3/3) organic clay loam, weak thin platy structure breaking to moderate fine granular; est. 5% gravel fragments (<1 cm diameter); slightly sticky, slightly plastic (wet); many fine and very fine roots; clear wavy boundary.
Bw1	6-27 cm. Brown (10YR 4/4) clay loam with common medium brown (10YR 4/6) mottles; moderate medium subangular blocky structure breaking to moderate fine granular; est. 20% gravel to 2 cm diameter; sticky, plastic (wet); common very fine roots; irregular boundary.
Bw2	27-50 cm. Dull yellowish brown (10YR 4/3) clay loam with common brownish black (10YR 3/1) organic inclusions and few prominent medium brown (10YR 4/6) mottles; moderate medium subangular blocky structure breaking to moderate fine granular; est. 20% gravel to 1.5 cm diameter.
Frost-scar element	
NOTES:	Permafrost at >100cm. Very contorted profile.
Bw1	0-5 cm. Brown (10YR 4/5) clay loam; moderate medium subangular blocky structure breaking to moderate fine granular; est. 15% fine gravel to 1 cm diameter; sticky, plastic (wet); common very fine roots; abrupt broken boundary.

Table 5. Soil Descriptions for Representative Vegetation Communities

Bw2	5-50+ cm. Dull yellowish brown (10YR 4/3) gravelly clay loam with large prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; est. 35% fine gravel to 2 cm diameter; sticky, plastic (wet).
Plot No. SW-33	
MICROSITE:	Sandstone outcrop with 2-5% cover of rounded glacial erratics, stable ground surface, no evidence of cryoturbation.
SUBSTRATE:	Sandstone rubble
VEGETATION:	Dry *Dryas octopetala*, *Salix phlebophylla*, *Selaginella sibirica*, *Antennaria friesiana*, *Cetraria cucullata* dwarf-shrub, fruticose-lichen tundra
CLASSIFICATION:	Pergelic Cryumbrept
NOTES:	Colors are for moist soil
A	0-3 cm. Brownish black (10YR 2/3) gravelly organic loam; moderate fine granular structure; est. 20% fine gravel fragments with occasional cobbles; friable (moist); slightly sticky, slightly plastic (wet); many fine and very fine roots; clear smooth boundary.
Bw1	3-15 cm. Dark brown (10YR 4/4) gravelly loam; weak medium subangular blocky structure breaking to moderate fine granular; est. 20% gravel fragments to 3 cm diameter with occasional angular cobbles to 10 cm diameter; friable (moist); slightly sticky, slightly plastic (wet); many fine and very fine roots; clear smooth boundary.
Bw2	15-35 cm. Brown (10YR 4/5) cobbly loam; weak subangular blocky structure breaking to moderate fine granular; est. 75% gravel and angular cobbles up to 12 cm diameter; friable (moist); slightly sticky, slightly plastic (wet); silt caps on tops of cobbles to 1 mm thick; continuous iron (2.5YR 3/4) manganese (5YR 2/1) coats on bottoms of cobbles; common fine roots.
Plot No. SW-42	
MICROSITE:	South facing, exposed sandstone outcrops with frost scars with few depressions up to 15 cm deep.
SUBSTRATE:	Sandstone rubble
VEGETATION:	Dry *Dryas octopetala*, *Salix phlebophylla*, *Conicularia divergens*, *Alectoria ochroleuca* dwarf-shrub, fruticose-lichen tundra
CLASSIFICATION:	Pergelic Cryumbrept
NOTES:	Colors are for moist soil
Oi	0-1 cm. Loose organic mat composed of lichens and moss.
A	1-3 cm. Brownish black (5YR 2/1) gravelly sandy loam sapric organic; moderate fine granular structure; est. 20% fine gravel by volume; friable (moist); slightly sticky, slightly plastic (wet); many very fine roots; common fine roots; abrupt smooth boundary.
Bw	3-40+ cm. Dark brown (10YR 3/4) gravelly sandy loam; moderate fine granular structure; est. 60% gravel by volume with numerous angular cobbles to 15 cm diameter; friable (moist); slightly sticky, slightly plastic (wet); silt caps on cobbles to 2 mm thick and some bridging of silt between cobbles; common very fine roots, few fine roots.

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW01	Oe	05-17	7.5YR2/2	83.20	0	0	1.4	25.8	72.8	c	11.5	0.24
SW01	BA	17-20+	7.5YR4/3	18.65							2.8	
SW02	IOe	00-10	2.5Y2/1.5	25.89	0	0	5.3	53.2	41.5	sic	4.2	
SW02	IA	10-19	2.5Y4/1	14.82	0	0	28.9	45.0	26.1	l	1.6	0.51
SW02	IIOeb	19-32	10YR2/2	51.89	0	0	6.3	45.3	48.5	sic	9.3	
SW02	IIBA	32-46	2.5Y4/1	7.55	35.5	5.3	30.0	41.2	28.8	cl	1.9	
SW03	Oi	00-06	5YR3/2	85.49							10.7	
SW03	Oe	06-24	5YR2/1	46.82	0	7.5	1.8	27.4	70.8	c	6.2	0.25
SW03	BA	24-32	7.5YR4/2	11.20							3.7	
SW04A	Oe	00-06	7.5YR2/1	48.63							5.8	
SW04A	Bwl**	06-08	10YR3.5/4	4.01							1.1	
SW04A	BW2	08-53	10YR3/3	3.94	5.0	12.0	38.8	32.5	28.8	cl	1.1	0.20
SW05	Oi	00-10	7.5YR2/1.5	63.66							8.2	0.18
SW05	Bw	10-40	10YR5/1	2.54	6.6	19.9	47.5	35.3	17.2	l	0.7	1.46
SW06	Oe	08-13	7.5YR1.7/1	83.17	0	0	8.8	32.1	59.1	c	5.5	
SW06	A	13-15	7.5YR4/3	34.10	20.0	16.7	19.5	10.3	33.5	scl	2.2	
SW06	Bw1	15-17	7.5YR5/6	3.34	0.2	4.9	36.6	27.4	30.9	cl	0.9	
SW06	Bw2	17-30	10YR4/2	2.60	1.8	7.5	31.5	27.0	32.0	cl	0.7	1.74
SW07	Oi	00-06	7.5YR2/3	34.87							4.6	
SW07	Oe	06-12	7.5YR4/2.5	54.12	0	0	8.3	50.3	41.4	sic	9.3	
SW07	Bw	12-40	7.5YR4/3	4.86							1.4	1.27
SW08	Oe	00-09	5YR1.7/1	79.70	0	0	19.1	36.4	44.6	c	3.6	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW08	BA	09-40	7.5YR4.5/4	4.96	11.3	6.9	31.3	19.2	31.3	scl	1.1	0.88
SW09	Oi	00-03	5YR2/1	77.17							8.6	
SW09	A	03-09	7.5YR4/4	25.02	0	40.5	32.9	44.1	23.0	l	3.4	1.27
SW09	Bw1	09-19	7.5YR4/5									
SW09	Bw2	19-65	5YR4/4									
SW10	Oi	00-05	5YR2/3	69.49							11.2	
SW10	Oe	05-10	5YR2/2	66.39	0	19.5	4.6	51.8	43.7	sic	7.8	0.25
SW10	Oa	10-15	7.5YR3/3	41.02							5.9	
SW10	BA	15-22	7.5YR5/2	4.53							1.4	
SW11	Oi	00-05	5YR2/2.5	54.25	0	0	3.7	38.5	57.9	sic	3.6	
SW11	Oa	05-10	7.5YR2/3	53.36	0	0	2.3	28.3	69.4	sic	5.5	0.23
SW11	BA	10-50	10YR4/3	9.10	0	0.3	20.6	34.5	44.6	c	1.3	
SW12	Oi	00-08	5YR2/3.5	82.24							9.3	
SW12	Oa	08-12	7.5Y3/3	37.21	0	44.3	1.9	96.1	2.0	s	5.9	
SW12	B/A	12-47	10YR4.5/3	4.80	13.5	11.3	40.8	33.6	25.6	l	1.3	1.68
SW13	Oi	00-16	5YR2/3	91.52							7.5	
SW13	Oa	16-23	7.5YR2.5/3	50.45	0	0	5.2	50.6	44.2	sic	6.7	0.34
SW13	BA	23-36	7.5YR3/4	11.44							1.6	
SW14	Oe	10-24	5YR2/3	77.40	0	0	2.9	47.9	49.2	sic	12.0	0.14
SW14	Oa	24-40+	5YR2/2	71.98							12.2	
SW15	Oi	00-10	7.5YR5/7	86.56							8.9	
SW15	Oe	10-35	7.5YR2.5/3	54.64	0	0	4.6	52.6	42.9	sic	6.1	0.28
SW16	Oi1	00-10	5YR2/4	28.69	0	0	74.9	14.9	10.2	sl	3.4	
SW16	Oi2	10-20	7.5YR2/3	24.44	0	0	73.1	14.2	12.7	sl	1.8	0.23

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW16	Oi3	20-40+	10YR2/3	24.69	0	0	69.5	17.1	13.4	sl	2.6	
SW17	Oi1	00-08	7.5YR4.5/6	89.37							10.0	
SW17	Oi2	08-29	2.5Y2/2	82.75	0	0	2.8	37.5	59.7	c	9.1	0.30
SW17	Oe	29-31	5YR3/2	62.53							7.7	
SW18	Oi1	00-05	5YR2/2	63.83							8.8	
SW18	Oi2	05-16	5YR2/2	60.22	0	0	1.7	70.9	27.4	sicl	6.9	0.14
SW18	Oe	16-36	5YR3/2	75.73							7.7	
SW18	Oa	36-46	7.5YR2/2	70.76	0	0	5.0	51.6	43.4	sic	5.2	
SW18	A	46-52	7.5YR3/3.5	35.38							4.0	
SW19	Oi	00-04	5YR2/4	80.15							11.1	
SW19	Oe	04-20	5YR2/2	83.01	0	0	3.3	35.8	60.9	c	11.9	0.17
SW19	Oa	20-25	7.5YR3/2	76.68							14.0	
SW19	A	25-28	10YR4/4	14.04							1.5	
SW20	Oi	00-07	5YR2/2.5	81.64							10.8	
SW20	Oe	07-16	7.5YR3/3	79.38	0	0	1.6	41.7	56.7	sic	6.8	0.19
SW20	Oa	16-25	7.5YR3/2	71.89							24.0	
SW20	A	25-30	10YR4/3.5	11.95							1.6	
SW21A	Oi	00-06	5YR2/2.5	62.84							8.1	
SW21A	Oe	06-31	7.5YR3/3	87.76	0	0	1.8	45.8	52.4	sic	8.2	0.13
SW21A	Oa1	31-34	5YR2/3	43.27							3.7	
SW21A	Oa2	34-46	5YR2/2	45.17							33.7	
SW22A	Oi1	00-03	5YR2/2	60.44	0	0	4.7	32.2	63.1	c	14.4	
SW22A	Oi2	03-18	7.5YR3/3	71.04	0	0	6.4	59.4	34.2	sicl	5.1	0.14
SW22A	Oe1	18-33	7.5YR2.5/3	82.43	0	0	4.5	55.5	40.0	sic	9.0	
SW22A	Oe2	33-37	7.5YR2/3	87.42	0	0	2.2	59.8	38.0	sicl	57.4	
SW22A	Oa	37-48	7.5YR2/3	55.81	0	0	32.2	44.3	23.7	l	6.9	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW23	Oi1	00-08	5YR2/2	69.26							9.4	
SW23	Oi2	08-28	7.5YR2.5/3	56.88	0	0	3.3	63.3	33.4	sicl	6.8	0.16
SW23	Oe1	28-36	7.5YR2.5/3	55.24	0	0	7.5	67.6	24.9	sil	12.2	
SW23	Oe2	36-44	10YR2.5/3	58.84							3.9	
SW23	Oa	44-46	7.5YR2/3	68.24							8.9	
SW24	Oi	00-15	5YR5/8	89.96							10.0	0.34
SW24	Oe	15-32	5YR2/2	76.03	0	0	2.6	62.6	34.7	sicl	6.7	
SW24	Oa1	32-38	7.5YR2/3	57.66	0	0	30.5	49.7	19.8	l	3.0	
SW24	Oa2	38-39	5YR2.5/3	63.25	0	0	26.9	50.4	22.6	sil	5.6	
SW25A	Oi	00-10	7.5YR6/8	88.36							10.8	
SW25A	Oe1	10-35	7.5YR2/3	81.32	0	0	0.8	63.0	36.2	sicl	10.5	0.14
SW25A	Oe2	35-41	7.5YR2/2	79.79							16.3	
SW25A	Oa	41-54	5YR2.5/2	47.74							39.1	
SW26	A	02-07	5YR2/2	47.19	0	0	32.5	45.4	22.1	l	4.8	0.25
SW26	Bw1	07-44	7.5YR4/3	0.84							1.1	
SW26	Bw2	44-63	10YR4/4	1.04							1.2	
SW27	Oe	02-12	5YR2/1	79.02	0	0	4.1	47.0	48.9	sic	9.8	0.29
SW27	Oa	12-22	5YR2/2	51.60							8.7	
SW27	A	22-32	7.5YR4/3	31.68							5.0	
SW27	Bw	32-64	10YR4/4	1.93							0.9	
SW28	A	00-04	7.5YR2/2	24.88							2.9	
SW28	Bw1	04-16	7.5YR5/6	3.23	7.6	26.3	55.1	34.8	10.1	sl	0.9	1.32
SW28	Bw2	16-68	10YR4/5	2.58							0.7	
SW29A	Oi	00-06	7.5YR2/3	63.47							8.1	
SW29A	A	06-12	5YR2/4	37.20							4.6	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW29A	Bw	12-25+	7.5YR5/5	5.49	23.6	28.4	42.2	33.9	23.9	cl	1.6	1.32
SW29B	Bw	00-25	10YR5/5	1.58	4.7	19.1	42.7	42.6	14.8	l	0.8	1.63
SW30A	A	00-03	5YR2/2	45.30							5.4	
SW30A	Bw1	03-20	10YR3.5/4	23.60	1.5	18.7	46.9	38.5	14.7	l	1.1	1.43
SW30A	Bw2	20-50+	10YR4/2.5	1.38	7.7	18.7	33.9	33.6	32.5	cl	1.6	
SW30B	Bw1	10-35	10YR4/4	1.96	0.8	11.3	32.8	45.0	22.2	l	1.0	1.47
SW30B	Bw2	35-50	10YR4/3.5	11.80							17.0	
SW31	Oe	03-08	5YR2/2	81.43							11.3	
SW31	Oa	08-16	5YR2/1.5	68.19	0	0	6.6	3.4	63.0	c	6.7	0.19
SW31	A	16-30	7.5YR4/3	13.62							2.7	
SW31	BA	30-52	10YR3.5/1	18.83							5.2	
SW32A	A	02-06	7.5YR3/3	29.27	0	6.9	30.7	33.4	35.9	cl	4.5	
SW32A	Bw1	06-27	10YR4/4	1.35	8.1	18.1	38.4	38.9	22.7	l	1.0	1.63
SW32A	Bw2	27-50	10YR4/3	1.13	50.5	8.0	35.1	33.0	31.9	cl	1.2	
SW32B	Bw1	00-05	10YR4/5		2.6	16.9	34.5	41.2	24.2	l		
SW32B	Bw2	05-50	10YR4/3	2.47	14.5	19.0	31.2	40.2	28.6	cl	1.2	1.70
SW33	A	00-03	10YR2/3	14.67	2.4	19.4	44.7	34.6	20.6	l	2.7	
SW33	BA	03-15	10YR4/4	6.03	8.5	12.1	34.4	43.8	21.8	l	1.9	0.90
SW33	Bw	15-35	10YR4/5	4.02	68.1	8.0	45.2	38.6	16.3	l	1.9	
SW34	Oe	00-05	2.5YR2/2	45.15							9.4	
SW34	Oa	05-21	7.5YR2/2	33.59	0	0	4.7	28.7	66.6	c	4.5	0.16
SW34	BA	21-42	10YR4/4	4.73							8.1	
SW35A	Oi	00-15	7.5YR3/4	52.26							5.6	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW35A	Oa	15-25	7.5YR3/3	32.88	0	0	12.1	28.1	59.8	c	8.4	0.29
SW35A	BA	35-45+	7.5YR4/2	3.93							2.6	
SW36A	Oe	03-08	7.5YR2/1	79.23							13.9	
SW36A	Oa	08-18	5YR2/1	59.84	0	0	1.3	28.0	70.7	c	9.1	0.27
SW36A	Bw	18-40+	10YR4/4	6.42							2.1	
SW37	Oi1	00-30	7.5YR2/3	70.83							8.7	0.19
SW37	Oi2	30-40	5YR2/2	54.80	0	0	12.2	45.0	42.8	sic	5.9	
SW37	Bw	40-50	10YR4/2	14.77							2.0	
SW38	A	01-04	10YR2/3	26.99							3.6	
SW38	Bw	04-40	10YR4/5	3.42	6.0	33.7	56.3	27.5	16.1	sl	1.5	1.18
SW39	A	01-05	7.5YR2/1.5	52.21							6.2	
SW39	Bw1	05-20	7.5YR3/3	8.80	0	29.7	65.8	23.4	10.8	sl	1.1	1.30
SW39	Bw2	20-50	10YR3.5/4	2.97							0.7	
SW40	A	01-12	7.5YR3/3	20.24	0	12.3	26.8	47.2	26.0	l	2.3	1.24
SW40	Bw	12-50+	10YR3/4	4.08							1.0	
SW41	A	03-14	5YR2/1	37.56	5.4	6.6	7.5	45.7	46.7	sic	5.7	0.36
SW41	Bw	14-40+	10YR4/4	1.84							0.6	
SW42	A	01-03	5YR2/1	36.55	3.3	19.5	57.3	24.8	17.9	sl	4.0	
SW42	Bw	03-40+	10YR3/4	4.88	36.2	17.5	55.1	29.9	15.0	sl	1.5	0.95
SW43	A	03-08	5YR2/1.5	51.05	0	26.6	23.7	53.9	22.5	sil	3.5	
SW43	Bw1	08-18	5YR4/5	3.83							0.9	1.30
SW43	Bw2	18-53	7.5YR4/4	3.23							0.7	
SW44A	Oa	06-12	5YR2/2	51.36	0	3.6	14.7	42.5	42.8	sic	4.1	0.47

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW44A	A	12-25	7.5YR3.5/4	16.15							1.9	
SW44A	Bw	25-56	10YR5/4	3.63							0.7	
SW45	Oe	07-22	5YR2/2	71.65							5.2	0.26
SW45	Oa	22-34	7.5YR3/2.5	55.23	0	0	3.0	25.0	72.0	c	4.5	
SW45	BA	34-60+	10YR4/3	7.24							1.0	
SW46	Oi	00-10	5YR4/5									
SW46	Oe	10-16	5YR3/2	59.64	0	0	3.7	70.3	26.0	sil	7.0	0.16
SW46	Oa	16-25	7.5YR3/3	50.13							9.4	
SW47	Oe	05-15	5YR2/2	38.62	0	0	16.3	52.7	31.0	sicl	4.3	0.21
SW47	A/B	15-60+	10YR3/2	11.84							1.6	
SW48	Oe	12-16	5YR2/2									0.22
SW48	Oa	16-25+	5YR2/2	37.47	0	0	6.7	47.6	45.7	sic	4.1	
SW49	Oe	00-10	5YR2/2.5	37.34							7.2	
SW49	Oa1	10-32	10YR2/3	28.41	0	0	3.3	49.5	47.2	sic	4.0	0.39
SW49	Oa2	32-40+	10YR3/2	22.15							2.8	
SW50	Oe	07-15	5YR2/2	76.67	0	0	3.1	39.2	57.7	c	6.8	0.22
SW50	BA	15-26	10YR3/2	10.06							2.1	
SW51	Oa	05-10	5YR2/2	42.25	0	17.8	37.9	40.8	21.3	l	3.5	0.38
SW51	A	10-14	7.5YR3/3.5	21.26							2.4	
SW51	Bw1	14-25	7.5YR4/6	7.66							1.8	
SW51	Bw2	25-45+	10YR4/4	2.45							1.0	
SW52	Oa	02-06	5YR2/2	32.21	0	14.4	36.4	39.1	24.5	l	3.2	
SW52	A	06-19	10YR4/6	5.64							1.5	0.88
SW52	Bw	19-40	10YR4/3	2.16							1.1	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW53	A	00-15	10YR3/3	7.68	21.6	31.7	74.0	19.0	7.0	sl	1.3	1.18
SW53	Bw	15-37	10YR4/4	1.76							1.1	
SW54	A	00-10	10YR3/3.5	6.45	10.4	13.0	70.5	21.8	7.7	sl	1.3	1.19
SW54	Bw	10-50+	10YR4/5	3.55							1.2	
SW55	A	06-26	5YR2/3	18.95	0	0	59.2	30.5	10.4	sl	2.3	0.55
SW56	Oe	05-12	5YR2/2									
SW56	Oa	12-32	5YR2/2	32.28	0	0	38.7	42.5	18.8	c	3.2	0.32
SW56	Bw	32-55	10YR3/3	3.39							1.4	
SW57	IA	05-15	5YR2/2.5	20.01	3.8	23.3	53.5	30.7	15.8	sl	2.2	0.52
SW57	IBw	15-40	7.5YR3/3	8.68							1.3	
SW57	IIBw	40-56	10YR3/3	3.89							1.6	
SW58A	A	00-02	7.5YR2/2	16.60	2.5	12.2	79.2	13.6	7.3	ls	2.2	
SW58B	Bw	00-35	10YR3/3	3.06	44.7	15.4	58.3	30.2	11.6	sl	1.4	1.12
SW59	Oa	04-15	5YR2/1.5	57.55	0	9.6	7.8	33.9	58.4	c	7.9	0.21
SW59	A	15-20	10YR2/3	7.17							1.3	
SW59	Bw	20-35	10YR3/3.5	4.15							1.1	
SW60	A1	02-16	5YR2/2.5	21.55	8.7	20.1	49.3	35.9	14.7	l	3.6	0.71
SW60	A2	16-24	7.5YR3/3	8.81							1.8	
SW60	Bw	24-50	10YR2.5/3	5.08							1.9	
SW61	Oi	00-13	7.5YR5/6									0.15
SW61	Oe	13-27	5YR2/1	77.73	0	0	0.7	30.9	68.4	c	11.4	
SW61	BA	27-32+	10YR4/1	8.18							1.8	

Table 6. Soil physical characteristics for the R4D permanent vegetation plots

					Particle Size (%, USDA size classes)*							
Plot No.	Horizon	Depth (cm)	Wet Color	% Org. Matter	Coarse Gravel	Fine Gravel	Sand	Silt	Clay	Texture	Hygro. Moist. (%)	Bulk Density (g/ cm3)
SW62	Oi	00-12	10YR4/6									0.31
SW62	Oe	12-23	5YR2/1	66.35	0	0	3.6	33.1	63.3	c	7.8	
SW62	Bw	23-26+	10YR4/2	8.03							1.1	
SW65	Oi	00-05	7.5YR2/3	30.60	0	0	13.2	53.9	33.0	sicl	3.4	
SW67	Oa	10	5YR2/1	85.07							11.3	
SW72	A	10	10YR3/2	13.88							6.1	
SW73	A	10	10YR2/3	11.31							6.1	

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW01	Oe	4.8	29.14	5828	10.18	1238	1.76	690	33.29
SW01	BA	3.9	3.08	616	1.31	159	0.13	49	
SW02	IOe	5.6	15.98	3196	5.18	630	0.52	204	21.44
SW02	IA	4.0	4.54	908	1.42	173	0.10	41	6.12
SW02	IIOeb	4.1	6.69	1338	1.68	205	0.16	63	6.69
SW02	IIBA	4.3	1.70	341	0.48	58	0.06	24	3.14
SW03	Oi	4.5	31.28	6256	9.85	1198	2.89	1131	
SW03	Oe	4.2	14.14	2828	2.97	362	0.32	124	14.26
SW03	BA	3.9	2.16	432	0.41	50	0.14	55	
SW04A	Oe	4.7	23.23	4645	4.51	548	1.64	642	
SW04A	Bwl	4.6	2.50	499	0.54	65	0.09	34	
SW04A	BW2	4.1	1.29	259	0.24	29	0.13	51	3.49
SW05	Oi	5.4	32.49	6498	8.55	1040	1.93	754	
SW05	Bw	4.5	0.96	192	0.24	29	0.05	2	2.48
SW06	Oe	4.7	20.05	4010	4.40	534	1.15	450	
SW06	A	4.2	5.59	1119	1.26	154	0.21	81	
SW06	Bw1	4.5	1.24	247	0.28	34	0.09	34	
SW06	Bw2	4.5	0.97	194	0.25	30	0.07	28	
SW07	Oi	3.9	7.52	1503	2.02	246	0.37	147	
SW07	Oe	6.0	22.14	4428	6.07	738	1.93	754	25.82
SW07	Bw	4.3	1.29	258	0.31	38	0.06	24	
SW08	Oe	4.6	27.45	5490	6.29	765	2.15	839	
SW08	BA	4.5	1.84	368	0.50	61	0.11	42	

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW09	Oi	3.5	5.70	1140	2.78	339	2.32	906	
SW09	A	3.6	1.03	208	0.50	61	0.38	148	4.36
SW09	Bw1	3.9	0.20	41	0.13	15	0.09	37	
SW09	Bw2	4.3							
SW10	Oi	5.0	24.69	4938	10.44	1269	3.32	1297	
SW10	Oe	4.8	14.70	2941	5.84	711	1.74	682	11.65
SW10	Oa	3.9	4.39	878	1.70	207	0.39	15	
SW10	BA	4.2	0.99	198	0.30	36	0.06	25	
SW11	Oi	5.7	7.44	1489	3.68	448	1.36	533	
SW11	Oa	4.5	3.56	711	1.28	155	0.40	156	
SW11	BA	4.3	0.76	151	0.23	27	0.09	34	
SW12	Oi	3.9	15.26	3052	4.14	504	2.41	943	
SW12	Oa	4.5	7.68	1535	1.71	208	0.51	200	56.60
SW12	BA	4.4	1.39	278	0.27	33	0.06	25	11.09
SW13	Oi	3.9	15.83	3167	5.30	644	1.81	707	
SW13	Oa	4.0	12.91	2582	3.42	416	0.61	239	6.35
SW13	BA	4.2	2.04	408	0.48	59	0.06	23	
SW14	Oe	4.6	18.26	3652	5.30	644	1.02	398	17.07
SW14	Oa	4.7	4.76	950	1.16	141	0.36	141	5.99
SW15	Oi	4.0	25.11	5022	10.28	1250	2.02	790	
SW15	Oe	4.0	3.86	773	1.29	157	0.15	60	
SW16	Oi1	4.7	6.30	1260	1.61	196	0.55	216	19.20
SW16	Oi2	4.2	4.33	866	0.90	110	0.09	33	3.53

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW16	Oi3	4.1	4.91	483	0.91	111	0.07	26	3.24
SW17	Oi1	3.7	13.11	2622	8.15	991	2.42	947	
SW17	Oi2	3.7	12.25	2450	5.64	685	0.90	352	10.60
SW17	Oe	3.8	3.64	728	1.31	159	0.40	156	
SW18	Oi1	4.5	14.53	2907	4.22	513	1.30	507	
SW18	Oi2	4.9	10.77	2154	3.25	396	0.97	379	35.00
SW18	Oe	4.0	8.32	1664	1.87	228	0.26	101	
SW18	Oa	3.6	3.92	784	1.22	148	0.13	49	5.03
SW18	A	4.1	2.13	425	0.62	75	0.04	15	
SW19	Oi	4.1	8.76	1752	3.93	478	2.46	961	5.86
SW19	Oe	4.5	10.06	2012	3.05	371	0.81	316	3.18
SW19	Oa	4.3	5.43	1087	1.27	154	0.34	134	19.32
SW19	A	3.9	1.26	252	0.33	41	0.04	14	2.56
SW20	Oi	3.7	12.48	2495	4.03	490	1.61	628	7.40
SW20	Oe	3.8	7.19	1438	1.81	220	0.31	122	8.03
SW20	Oa	4.0	3.60	720	0.69	84	0.12	48	9.68
SW20	A	4.1	0.95	190	0.34	42	0.04	15	2.23
SW21A	Oi	4.1	5.38	1077	2.71	330	0.92	361	8.21
SW21A	Oe	4.4	4.20	840	0.95	115	0.18	70	
SW21A	Oa1	3.8	3.51	701	0.71	86	0.03	13	
SW21A	Oa2	4.2	4.18	835	0.68	82	0.04	17	
SW22A	Oi1	4.5	9.78	1955	3.88	471	1.15	449	17.70
SW22A	Oi2	3.9	6.00	1200	2.47	300	0.45	176	12.25
SW22A	Oe1	3.9	5.01	983	1.80	219	0.17	67	6.05
SW22A	Oe2	4.3	3.88	777	0.74	90	0.08	31	9.40

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW22A	Oa	3.8	3.15	631	0.60	72	0.02	9	2.38
SW23	Oi1	4.2	8.45	1690	2.25	274	0.83	324	
SW23	Oi2	4.4	8.27	1653	1.46	178	0.23	89	16.59
SW23	Oe1	4.3	6.18	1235	0.84	102	0.07	26	3.50
SW23	Oe2	3.9	3.68	736	0.63	76	0.03	13	
SW23	Oa	4.1	4.26	851	0.77	94	0.08	32	
SW24	Oi	4.0	18.66	3732	10.03	1220	1.64	643	15.89
SW24	Oe	3.7	5.99	1198	2.48	301	0.44	170	45.70
SW24	Oa1	3.6	1.85	370	0.57	69	0.05	18	2.87
SW24	Oa2	3.8	3.13	626	0.77	94	0.07	29	4.20
SW25A	Oi	4.5	20.97	4195	10.11	1230	2.39	935	
SW25A	Oe1	4.1	4.68	937	2.35	286	0.62	243	2.82
SW25A	Oe2	4.3	2.91	582	0.63	77	0.10	40	
SW25A	Oa	3.8	1.82	364	0.44	54	0.04	16	
SW26	A	4.3	20.78	4157	1.97	239	0.58	23	5.98
SW26	Bw1	6.1	8.00	1599	0.50	61	0.12	45	
SW26	Bw2	6.2	11.10	2221	0.57	69	0.16	64	
SW27	Oe	5.2	28.79	5758	4.71	572	0.33	129	23.14
SW27	Oa	4.9	32.55	6509	2.99	36	0.25	97	
SW27	A	4.6	19.43	3885	2.04	248	0.18	70	
SW27	Bw	4.8	3.24	649	0.49	60	0.05	19	
SW28	A	4.4	5.56	1111	1.57	191	0.56	219	
SW28	Bw1	3.9	0.29	58	0.11	14	0.08	31	3.17
SW28	Bw2	4.3	0.34	69	0.11	13	0.05	20	

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW29A	Oi	3.7	9.02	1804	3.19	388	1.24	486	8.77
SW29A	A	4.0	2.84	568	1.12	136	0.55	216	7.47
SW29A	Bw	4.0	2.27	454	0.49	59	0.08	32	4.85
SW29B	Bw	4.6	1.73	346	0.28	34	0.05	19	2.21
SW30A	A	4.2	4.75	950	1.68	204	0.74	290	
SW30A	Bw1	4.2	0.90	180	0.30	36	0.08	33	4.27
SW30A	Bw2	5.0	9.40	1879	2.01	244	0.23	90	
SW30B	Bw1	4.5	2.05	409	0.60	73	0.11	42	4.31
SW30B	Bw2	5.2	8.69	6000	2.10	887	0.29	398	
SW31	Oe	4.9	38.73	7746	8.73	1061	1.18	462	
SW31	Oa	4.6	30.10	6020	5.48	666	0.40	156	13.83
SW31	A	4.4	8.82	1764	1.89	230	0.11	43	
SW31	BA	4.8	13.62	2723	2.58	316	0.15	60	
SW32A	A	4.0	3.32	664	1.41	171	0.54	210	4.44
SW32A	Bw1	4.8	2.95	590	0.84	103	0.11	42	1.93
SW32A	Bw2	5.1	6.72	1343	1.59	193	0.17	65	1.55
SW32B	Bw1	4.6	2.57	514	0.98	119	0.12	48	1.74
SW32B	Bw2	4.6	1.51	302	0.44	53	0.15	59	2.51
SW33	A	4.3	4.63	925	1.87	227	0.32	126	21.75
SW33	BA	4.3	1.61	322	0.65	79	0.13	52	2.90
SW33	Bw	4.3	1.42	284	0.55	67	0.10	39	2.54
SW34	Oe	6.6	12.54	2507	5.29	644	1.77	693	
SW34	Oa	3.8	7.46	1493	2.77	336	0.16	62	20.04

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW34	BA	4.4	1.61	323	0.61	74	0.04	17	
SW35A	Oi	5.1	20.50	4099	6.53	794	2.21	865	
SW35A	Oa	4.2	7.37	1474	2.42	294	0.33	130	56.00
SW35A	BA	4.1	1.27	254	0.47	57	0.06	24	
SW36A	Oe	5.3	36.33	7865	9.40	1144	1.62	632	
SW36A	Oa	4.3	10.96	2192	1.85	224	0.32	126	16.59
SW36A	Bw	4.2	2.17	435	0.42	50	0.05	19	
SW37	Oi1	4.1	4.96	991	0.98	119	0.16	64	
SW37	Oi2	4.4	3.40		0.67		0.12		3.86
SW37	Bw	4.1	1.20		0.32		0.03		
SW38	A	3.5	2.30		0.95		0.46		
SW38	Bw	4.0	0.17	34	0.07	9	0.10	39	2.05
SW39	A	3.8	3.02		1.63		0.85		
SW39	Bw1	3.5	0.56	112	0.26	32	0.10	40	3.94
SW39	Bw2	4.2	0.57		0.13		0.05		
SW40	A	3.8	2.58	515	0.95	115	0.38	148	4.33
SW40	Bw	3.7	0.16		0.05		0.03		
SW41	A	4.2	10.21	2041	2.62	319	0.35	138	90.10
SW41	Bw	4.5	1.00		0.28		0.05		
SW42	A	5.1	19.52	3904	5.92	722	0.89	350	11.22
SW42	Bw	4.8	1.95	39	0.88	11	0.11	4	2.95
SW43	A	3.4	1.45	29	1.67	203	0.40	155	4.82

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW43	Bw1	3.8	0.15	30	0.17	21	0.08	31	
SW43	Bw2	3.9	0.29	58	0.19	23	0.09	34	
SW44A	Oa	4.2	11.72	2344	4.04	492	1.02	397	4.42
SW44A	A	4.3	6.14	1228	1.80	220	0.17	66	
SW44A	Bw	4.9	3.24	649	0.91	110	0.12	48	
SW45	Oe	4.4	8.14	1628	2.32	284	0.82	322	
SW45	Oa	4.0	4.11	822	1.13	138	0.29	114	8.02
SW45	BA	4.3	1.62	325	0.50	61	0.12	48	
SW46	Oi								
SW46	Oe	5.2	15.50	3099	2.77	338	0.45	176	17.28
SW46	Oa	3.4	2.00	400	0.98	120	0.42	165	
SW47	Oe	6.3	34.14	6827	6.77	826	0.80	314	10.16
SW47	A/B	4.2	5.37	1073	1.83	224	1.02	61	
SW48	Oe								
SW48	Oa	4.1	12.20	2441	4.62	563	1.26	92	4.72
SW49	Oe		12.04	2407	4.64	566	1.95	762	
SW49	Oa1	3.4	3.16	632	1.00	241	0.21	81	1.22
SW49	Oa2	3.7	3.80	759	0.76	93	0.24	93	
SW50	Oe	4.7	34.89	6979	8.95	1093	1.54	600	11.59
SW50	BA	4.3	5.93	1186	1.96	239	0.11	42	
SW51	Oa	4.0	8.66	1732	4.27	521	0.48	187	5.52
SW51	A	4.2	9.11	1823	3.98	403	0.14	54	
SW51	Bw1	4.4	3.56	713	1.45	177	0.08	31	

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW51	Bw2	4.5	3.12	623	1.29	157	0.08	31	
SW52	Oa	4.4	12.42	2484	4.41	539	1.06	416	10.98
SW52	A	4.2	1.93	385	1.07	130	0.02	52	
SW52	Bw	5.0	5.21	1042	1.62	197	0.14	55	
SW53	A	5.5	6.24	1248	3.57	436	0.31	119	7.57
SW53	Bw	5.1	4.39	878	2.28	278	0.11	44	
SW54	A	5.3	5.85	1169	2.87	350	0.31	120	3.91
SW54	Bw	5.0	3.71	742	1.78	218	0.15	58	
SW55	A	4.2	4.05	811	1.88	229	0.17	67	3.76
SW56	Oe								
SW56	Oa	4.2	11.69	2339	3.76	459	0.34	133	3.13
SW56	Bw	6.1	11.03	2206	1.95	238	0.16	64	
SW57	IA	4.3	5.95	1190	2.15	262	0.16	80	3.24
SW57	IBw	4.7	7.18	1436	1.72	219	0.13	51	
SW57	IIBw	6.0	9.00	1799	2.21	269	0.16	64	
SW58A	A	5.4	22.01	4401	7.34	896	0.60	235	4.37
SW58B	Bw	6.0	4.90	980	2.91	355	0.20	76	3.89
SW59	Oa	5.8	86.27	17255	4.57	558	0.28	110	5.12
SW59	A	5.8	17.94	3589	1.12	126	0.13	51	
SW59	Bw	5.8	12.05	2410	0.80	97	0.12	46	
SW60	A1	4.5	11.54	2308	5.51	672	0.50	196	1.94

Table 7. Soil chemical characteristics for the R4D permanent vegetation plots

			CATIONS						ANIONS
			Ca++		Mg++		K+		NO3
Plot No.	Horizon	pH	meq/100g	µg/g	meq/100g	µg/g	meq/100g	µg/g	µg/g
SW60	A2	4.3	5.84	1167	3.11	380	0.17	67	
SW60	Bw	5.6	9.02	1804	3.51	428	0.18	72	
SW61	Oi								
SW61	Oe	4.9	38.72	7745	7.94	969	0.66	260	5.43
SW61	BA	4.4	5.50	1100	2.13	260	0.13	53	
SW62	Oi								
SW62	Oe	4.6	13.61	2723	2.69	328	0.52	205	4.12
SW62	Bw	4.4	2.25	449	0.84	102	0.11	45	
SW65	Oi	5.4	10.97	2195	10.85	1323	0.19	74	8.39
SW67	Oa	3.7	10.55	2111	1.29	157	0.50	195	
SW72	A	5.3	9.58	1915	1.90	232	0.26	102	
SW73	A	5.1	7.41	1481	1.52	186	0.16	64	

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Vascular Plants																												
Shrubs																												
Andromeda polifolia	-														+	+		+	+			+	+	+	05		+	05
Arctous alpina			01			-				30																		
Betula nana exilis	03	+	05	01	10	45	30	25	20	05	40	07	30	25	05	35		20	01	05	05		01		02		25	15
Cassiope tetragona tetragona	01		+		+	02	-	+	+	+			02		-			+										
Diapensia lapponica ssp. *obovata*																												
Dryas intergrifolia integrifolia																												
Dryas octopetala octopetala																												
Empetrum hermaphroditum	05		01	+	03	+	+		03				03															
Ledum palustre decumbens	02		05	01	05	05	05	05	15	05	01		05	05				05									10	
Loiseleuria procumbens																												
Potentilla palustris																												
Rhododendron lapponicum																												
Rubus chamaemorus	+	+	+	+	05	01	01	07	+		05	02	02	05	20	20		20	-	+	+						10	
Salix arctica																												
Salix chamissonis																			15									
Salix fuscescens		01													05	05			10	20	25	+	+	05	05		+	10
Salix phlebophylla									01	10																		
Salix planifolia pulchra	15	35	07	10	55	20	05	40	03		10	20	20	15	05				05									
Salix reticulata reticulata			+																									
Salix rotundifolia rotundifolia																												
Vaccinium uliginosum	15		03	05	25	05	03	03	01					+	+			01	-				01		+		+	
Vaccinium vitis-idaea minus	02		05	04	02	05	05	05	05	+	01		05	10	+			05		+							05	-
Graminoids																												
Arctagrostis latifolia		+							-		+		+															
Calamagrostis canadensis canadensis																												
Calamagrostis inexpansa																												
Carex aquatilis s.l.															20	02	60		50							40		
Carex bigelowii	18		07	10	20	15	30	15	20	-	12	+	30	25		-					+						-	
Carex microchaeta																												
Carex misandra																												
Carex obtusata																												
Carex podocarpa																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Carex rariflora															05				05	01	01	10	+	10	05		-	15
Carex rotundata																+			-	01	10	10	+	05		10	-	02
Carex rupestris																												
Carex saxatilis laxa																												
Carex scirpoidea																												
Carex vaginata																												
Eriophorum angustifolium s.l.																												
Eriophorum angustifolium subarcticum		35		01					+		-	35				+	30	+		+		+	+	+		05		-
Eriophorum russeolum																					10							
Eriophorum scheuchzeri scheuchzeri																+	+		5	20		10	+	05	05	05		10
Eriophorum vaginatum	02		45	40	05		+	15	05	+			10	05		-		15									20	
Festuca altaica											03																	
Festuca sp.																												
Hierochloe alpina										05																		
Juncus biglumis																												
Kobresia myosuroides																												
Luzula arctica																												
Luzula confusa										+																		
Luzula sp.																												
Luzula wahlenbergii								-																				
Poa arctica		+							+										-									
Poa glauca																												
Poa lanata																												
Poa pauspicula																												
Poa sp.																												
Trisetum spicatum spicatum																												
Unknown graminoid																												
Forbs, Horsetails, Ferns, Clubmosses, Spikemosses																												
Acomastylis rossii																												
Aconitum delphinifolium delphinifolium																			++									
Anemone drummondii																												
Anemone parviflora																												
Anemone sp.																												
Antennari alpina var. *media*																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Arnica frigida																		+										
Arnica lessingii																												
Artemisia arctica arctica																												
Astragalus umbellatus																												
Bistorta plumosa			+		+	+	01	+	04	+	01		01	01														
Bistorta vivipara						-							+						++									
Bupleurum triradiatum																												
Campanula lasiocarpa																			-									
Cardamine pratensis angustifolia		-																										
Douglasia ochotensis																												
Draba sp.																												
Equisetum arvense		01																										
Equisetum scirpoides																												
Equisetum variegatum variegatum																												
Erigeron muirii																												
Eritrichum aretioides																												
Gentiana glauca																												
Hippuris vulgaris																												
Huperzia selago ssp. *appressa*															-								+					+
Minuartia arctica																												
Minuartia obtusiloba																												
Novosieversia glacialis																												
Orthilia secunda ssp. *obtusata*																												
Oxytropis nigrescens s.l.																												
Oxytropis sp.																												
Papaver macounii																												
Parrya nudicaulis s.l.																												
Pedicularis albolabiata						-													+			+	+	02	+	+		+
Pedicularis capitata																												
Pedicularis kanei kanei	-		+		+										+													
Pedicularis labradorica								-								-			+									
Pedicularis langsdorfii																												
Pedicularis lapponica	+					++	+	+			+		+	+	03	01		+		+	++				+		+	01
Petasites frigidus	+			03	05	01	02	02	02		05	02	+	+														
Phlox sibirica sibirica																												
Polemonium acutiflorum		+									+	+																

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Potentilla uniflora																												
Pyrola grandiflora					+	++		+										+										
Ranunculus sp.																												
Saussurea angustifolia																												
Saxifraga bronchialis funstonii																												
Saxifraga cernua		+																										
Saxifraga foliolosa																			+									
Saxifraga nelsoniana		+		+	+	+	+	+					+															
Saxifraga nivalis																												
Saxifraga rivularis																												
Saxifraga tricuspidata																												
Selaginella sibirica																												
Senecio atropurpureus frigidus	+						+	+																				
Silene acaulis																												
Smelowskia calycina																												
Sparganium hyperboreum																												
Stellaria longipes		+																										
Tofieldia pusilla																												
Unknown dicot	-																											
Valeriana capitata		+																	++									
Bryophytes																												
Mosses																												
Aulacomnium palustre	05	05	+	05	20	10	20	15	10		10	+	10	10	10													
Aulacomnium turgidum	05		20	05	20	20	20	15	15		03	+	10	10	10	15		10	+	10	03		05		05		10	10
Brachythecium groenlandicum		+																										
Brachythecium sp.		10																										
Brachythecium turgidum		+																										
Bryum algovicum																												
Bryum pseudotriquetrum																												
Bryum sp.																												
Calliergon giganteu																												
Calliergon sarmentosum				05		+																						
Calliergon sp.																												
Calliergon stramineum							+					+	+		+	+		+	+									
Campylium stellatum		10				+		+																				
Ceratodon purpureus					+					+																		

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Cirriphyllum cirrosum																												
Cynodontium sp.																												
Dicranella sp.				+																								
Dicranella varia																												
Dicranum acutifolium				+	+													+									+	
Dicranum angustum	05		01	+	+	10	01		01		05		03	++	+	02		01	02	+			+				01	+
Dicranum elongatum	05							04	06		05			++													30	
Dicranum groenlandicum			10				05						05															
Dicranum muelenbeckii																							01					
Dicranum scoparium																												
Dicranum sp.			+							+											01							
Drepanocladus badius			+	15		03																						
Drepanocladus revolvens			+																									
Drepanocladus sp.																					+	+						
Drepanocladus uncinatus		15		05		03		05			+		+	+					+									
Encalypta brevicolla																												
Encalypta rhaptocarpa																												
Hylocomium splendens obtusifolium	15	01	20	10	10	30	40	30	+		15		25	20	+	+		+									+	
Hypnum bambergeri	+		+			+					+																	
Hypnum sp.													+															
Meesia sp.								+																				
Meesia uliginosa				+	+																							
Mnium sp.																												
Paludella squarrosa		-																										
Plagiomnium medium																												
Pleurozium schreberi			+																									
Pogonatum urnigerum																												
Pohlia andrewsii																												
Pohlia crudoides																												
Pohlia elongata																												
Pohlia nutans	+					+	+			+	+	+	+			+		+	+	+	+						+	
Pohlia sp.				+		+																						
Politrichastrum alpinum								01			+				10				05								+	
Polytrichaceae family																												
Polytrichum commune												02		+				10		12	01							
Polytrichum hyperboreum																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Polytrichum longisetum																												
Polytrichum piliferum										+																		
Polytrichum sexangulare																												
Polytrichum sp.													+															
Polytrichum strictum	+		-	+	+	++	02		10	15	02	03	05	10		20					15	+	+				10	
Polytrichum swartzii																												
Pseudobryum cinclidioides																												
Ptilium cristum-castrensis																												
Rhacomitrium lanuginosum									+														+					
Rhizomnium andrewsianum	+		+												+													
Rhytidium rugosum																												
Sphagnum angustifolium		01				05							+					05		02	10						+	
Sphagnum aongstroemii				+	+	+					+				+	+		+		05	02						+	+
Sphagnum balticum				02	10		+					+			+				05	02	05			5			+	
Sphagnum compactum															+	+									+			
Sphagnum fimbriatum															05				+						+			05
Sphagnum girgensohnii			+			05	+		+		02	05		+		05											+	
Sphagnum imbricatum						30									25							02		05	+			20
Sphagnum lenense	15		05											+	10	+		60	+	70	50		02		15		10	05
Sphagnum lindbergii															+							20		55				
Sphagnum magellanicum															+	10												
Sphagnum nemoreum								05																				
Sphagnum obtusum																												
Sphagnum orientale																					+		+					
Sphagnum rubellum	20	01	05	02	20	10	05	05	10		10	05	10	05	20	15		20	05	10	10		+	+	05		05	10
Sphagnum sp.	10													25						02	20							
Sphagnum squarrosum																	+											
Sphagnum subsecundum																			02							10		
Sphagnum teres		01		01	10	30	10	20	25		20	+	35			35			05									
Sphagnum warnstorfii															+				+	+	+							
Sphachnaceae																											+	
Splachnum sphaericum																												
Tetraplodon pallidus																												
Thuidium abietinum																												
Tomenthypnum nitens	+	+	-	05	+	+	+	01			+	+	+										+					
Tortula ruralis																												
Unknown moss																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Liverworts																												
Anastrophyllum minutum			+	+	+		+							+	+	+		+			+		+				+	
Aneura pinguis																						+				-		
Blepharostoma trichophyllum brevirete			+	+	+	+	+					+	+	+	+	+		+										+
Calypogeia sp.			+																+									
Cephaloziella sp.																			+									
Chandonanthus setiformis																												
Diplophyllum albicans																												
Diplophyllum opacifolia																												
Gymnomitriom coninnatum																												
Gymnomitriom sp.																												
Lophozia binsteadii	+																											
Lophozia guttulata																												
Lophozia quadriloba																												
Lophozia sp.			+	+	+	+			+			+				+												
Macrodiplophyllum plicatum																												
Mylia anomala																								+	+		+	
Pseudolepicola fryei															+													
Ptilidium ciliare	01		02		+	05		05					+															+
Radula prolifera																												
Scapania paludicola						02		+				+		+							+	+						+
Scapania simsonii																												
Tritomaria quinquedentata	+					+				+		+	+		+	+			+	+							+	+
Unknown leafy liverwort				02	+				+		+																	
Unknown thalloid liverwort																												
Lichens																												
Fruticose																												
Alectoria nigricans																											-	
Alectoria ochroleuca									-	05																		
Baeomyces sp.										+																		
Cetraria andrejevii																												
Cetraria commixta																												
Cetraria cucullata	+		+		+	+	02	+	03	+	+		+	+	+	+		+		+			+				10	+
Cetraria delisei																												
Cetraria fastigiata														+	+													

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Cetraria hepatizon																												
Cetraria inermis																												
Cetraria islandica	+		+		+	+	+	+	+	01			+		+	+		+					+				01	
Cetraria kamczatica							+																					
Cetraria laevigata																												
Cetraria nigricans										+																		
Cetraria nivalis			+						07	35																	+	
Cetraria pinastri											+																	
Cetraria richardsonii			+				+		+	+			+			+												
Cetraria sepincola														+		+												
Cetraria sp.										03																		
Cetraria tilesii																												
Cladonia alaskana																												
Cladonia amaurocraea	+		+		+	+		+	+	+	+		+			+		+					+				05	
Cladonia arbuscula					+		+		+														+					
Cladonia carneola	+		+						+		+		+														+	
Cladonia cenotea	+		+				+																					
Cladonia chlorophaea																+											+	
Cladonia coccifera										+																		
Cladonia cornuta																												
Cladonia deformis																											+	
Cladonia ecomocyna																												
Cladonia fimbriata							+				+																	
Cladonia gracilis			02		+	+	01	+	02	03	+		+														03	
Cladonia macrophylla										+																		
Cladonia mitis	+		01		+			+	+	+			+		+			+									05	
Cladonia pleurota																											+	
Cladonia pocillum																												
Cladonia pyxidata																												
Cladonia rangiferina	+		+			+	+	+	01		+		+			+		+			+		+				10	
Cladonia spp.	+						+		02	10			+	+		+		+					+				+	
Cladonia stellaris																												
Cladonia subulata																												
Cladonia sulphurina	+																											
Cladonia uncialis							+																					
Cornicularia aculeata																												
Cornicularia divergens							-		+	15																		

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Dactylina arctica	+		+		+	+	+	+	01	+			+	+	+	+		++					+				02	
Dactylina beringica																												
Dactylina ramulosa																											-	
Lobaria linita					+				-																			
Pseudephebe pubescens																												
Sphaerophorus fragilis																												
Sphaerophorus globosus									-	10	+																	
Stereocaulon paschale																												
Stereocaulon tomentosum																												
Thamnolia spp.	-		+				+		-	+					+	+												
Foliose																												
Asahinea chrysantha																												
Asahinea scholanderi																												
Hypogymnia subobscura																												
Nephroma arcticum																												
Nephroma expallidum																												
Ochrolechia upsaliensis																												
Parmelia omphalodes																												
Parmelia septentrionalis											+			+														
Parmelia stygia																												
Parmelia sulcata																												
Peltigera aphthosa		+		+	1	+	+		+				+	+														
Peltigera canina																												
Peltigera horizontalis																												
Peltigera leucophlebia																												
Peltigera malacea				+	+																							
Peltigera polydactyla			+															+										
Peltigera scabrosa			+					+	+		+			+				+										
Peltigera sp.	+			+	+	+	+		+		+		+															
Solorina bispora																												
Solorina crocea																												
Solorina saccata																												
Solorina sp.																												
Umbilicaria caroliniana																												
Umbilicaria hyperborea																												
Umbilicaria proboscidea																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	01	02	03	04A	04B	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21A	21B	22A	22B	23	24	25A
Umbilicaria sp.																												
Crustose																												
Caloplaca jungermanniae																												
Caloplaca sp.																												
Candelariella sp.																												
Dermatocarpon lachneum																												
Haematomma lapponicum																												
Lecanora epibryon																												
Lecanora sp.																												
Lecidea demissa										+																		
Lecidea flavocaerulescens																												
Lecidea sp.																												
Mycoblastis sanguinarius																												
Ochrolechia frigida																												
Ochrolechia sp.																												
Pertusaria bryontha																												
Pertusaria dactylina							+			+																		
Pertusaria panygra										+																		
Pertusaria sp.																												
Polyblastia gelatinosa																												
Psoroma hypnorum																												
Rhizocarpon geographicum																												
Rinodina turfacea																												
Unknown crustose lichen																												
Xanthoria centrifuga																												
Xanthoria separata																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Vascular Plants																												
Shrubs																												
Andromeda polifolia	+																											
Arctous alpina				20		01						+							60					03				
Betula nana exilis	+				15		10	+	05	05	+			02	+	02						+		+	+	+	15	65
Cassiope tetragona tetragona		15	03	+	02		05	+	01	20	+			+						+	45	65		+	15	05	15	
Diapensia lapponica ssp. *obovata*		+		07	+	+	+			+										01	+	+		05	+	+		
Dryas intergrifolia integrifolia		05																										
Dryas octopetala octopetala												40											40					
Empetrum hermaphroditum					01							01																
Ledum palustre decumbens			+	01	10	+	05	+	01	+	+			+						+					07		05	+
Loiseleuria procumbens		+					+	+			+									01								
Potentilla palustris																												
Rhododendron lapponicum																												
Rubus chamaemorus													+	01		01	+											15
Salix arctica																												
Salix chamissonis		+								+												20						
Salix fuscescens	+	+																										
Salix phlebophylla		+		10	05		10	+		20	+	05								05			10	15	10	03		
Salix planifolia pulchra			15				+		20	02			35	40	10	40	25					+						01
Salix reticulata reticulata		03	10								+					+						+						
Salix rotundifolia rotundifolia																						+						
Vaccinium uliginosum		10	01	01	01		05	+		01										+		-	+	+	+		02	
Vaccinium vitis-idaea minus		+	03	01	05	+	05	+	02	02	+	05		02					10	30	05	+	03	10	20	+	10	03
Graminoids																												
Arctagrostis latifolia													+	+		+												
Calamagrostis canadensis canadensis																												
Calamagrostis inexpansa					10		02			02	+													+	+			
Carex aquatilis s.l.																												
Carex bigelowii		07	35		01		05		30	03				20	+	02											35	15
Carex microchaeta				+								+							+	+	10	05	+	+				
Carex misandra																												
Carex obtusata																												
Carex podocarpa																												
Carex rariflora	10																											

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Carex rotundata	02																											
Carex rupestris																							01					
Carex saxatilis laxa		+																										
Carex scirpoidea																												
Carex vaginata		+																										
Eriophorum angustifolium s.l.		+																							+			
Eriophorum angustifolium subarcticum													60	+	20	20	25											+
Eriophorum russeolum																												
Eriophorum scheuchzeri scheuchzeri	05																											
Eriophorum vaginatum									+																		02	+
Festuca altaica																												
Festuca sp.																							+					
Hierochloe alpina				+						+		05							01	20	05		++	01				
Juncus biglumis		+																										
Kobresia myosuroides																												
Luzula arctica						+		+			+															02		
Luzula confusa																					+							
Luzula sp.																												
Luzula wahlenbergii																												
Poa arctica		+							+					+		+						+	+					
Poa glauca																							+					
Poa lanata																												
Poa pauspicula																												
Poa sp.																												+
Trisetum spicatum spicatum																												
Unknown graminoid													+															
Forbs, Horsetails, Ferns, Clubmosses, Spikemosses																												
Acomastylis rossii																												
Aconitum delphinifolium delphinifolium																												
Anemone drummondii																												
Anemone parviflora			+																									
Anemone sp.																												
Antennari alpina var. *media*												01											+					
Arnica frigida		+	+							+		+										+						

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Arnica lessingii					+		+																					
Artemisia arctica arctica												-									05	02	+					
Astragalus umbellatus																												
Bistorta plumosa		+	+		+		01	+	+	+			+	+		+				05	+	02	-		+	+	+	+
Bistorta vivipara		+	+		+		+		+					+		+						+			+			
Bupleurum triradiatum																							+					
Campanula lasiocarpa																												
Cardamine pratensis angustifolia																												
Douglasia ochotensis																												
Draba sp.																												
Equisetum arvense																												
Equisetum scirpoides		+																										
Equisetum variegatum variegatum																												
Erigeron muirii																												
Eritrichum aretioides																												
Gentiana glauca																					+							
Hippuris vulgaris																		05										
Huperzia selago ssp. *appressa*		+					+	+														-						
Minuartia arctica						+						-																
Minuartia obtusiloba																							+					
Novosieversia glacialis																												
Orthilia secunda ssp. *obtusata*		+																										
Oxytropis nigrescens s.l.																												
Oxytropis sp.																												
Papaver macounii																												
Parrya nudicaulis s.l.		+																										
Pedicularis albolabiata	01	+	+																									
Pedicularis capitata		+	+		+	+																++			+	+		
Pedicularis kanei kanei		+	+		+	+		+		+									-			+			+			
Pedicularis labradorica																												
Pedicularis langsdorfii					+	+	++		+														+					
Pedicularis lapponica																												
Petasites frigidus		+	02		+	+	02	+	20	+	+		20	10		03	+								+	+	01	+
Phlox sibirica sibirica																												
Polemonium acutiflorum													+			01	+											
Potentilla uniflora																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Pyrola grandiflora			01				+		++					+								+					01	
Ranunculus sp.																												
Saussurea angustifolia																												
Saxifraga bronchialis funstonii												+											+					
Saxifraga cernua																												
Saxifraga foliolosa																												
Saxifraga nelsoniana													+	+		01												
Saxifraga nivalis																							+					
Saxifraga rivularis																												
Saxifraga tricuspidata																												
Selaginella sibirica												-											01					
Senecio atropurpureus frigidus			+						+	+																+		
Silene acaulis																												
Smelowskia calycina																												
Sparganium hyperboreum																		50										
Stellaria longipes		+																										
Tofieldia pusilla		+																										
Unknown dicot																												
Valeriana capitata																+												
Bryophytes																												
Mosses																												
Aulacomnium palustre									05				02	20	05	10	+									05	20
Aulacomnium turgidum	+	02	10		10		05	+	10	05	+			05	+							05			10		30	07
Brachythecium groenlandicum																												
Brachythecium sp.																+	+											
Brachythecium turgidum																												
Bryum algovicum												+																
Bryum pseudotriquetrum																												
Bryum sp.																												+
Calliergon giganteu																		05										
Calliergon sarmentosum																	+											
Calliergon sp.																												
Calliergon stramineum													10		+		+											
Campylium stellatum																												
Ceratodon purpureus																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Cirriphyllum cirrosum									+																			
Cynodontium sp.																												
Dicranella sp.																												
Dicranella varia										+	+																	
Dicranum acutifolium		+							+	10	+	+							+	+	35	05			01			
Dicranum angustum		+							+				+	05	+							+					10	02
Dicranum elongatum		+		05					+										10	10	10	+	01	01			15	
Dicranum groenlandicum		+			+					25	+														10	02		
Dicranum muelenbeckii			20		30		05																					
Dicranum scoparium																												
Dicranum sp.		15	05				20	01	40			01		+	+	02	+				+							05
Drepanocladus badius	+		+																								+	
Drepanocladus revolvens	+																											
Drepanocladus sp.																		+										
Drepanocladus uncinatus													15	05	10	+	10										+	+
Encalypta brevicolla												+											++					
Encalypta rhaptocarpa																												
Hylocomium splendens obtusifolium		02	35		10		05		20	01	+		+	10	+	15	+					25			02		20	50
Hypnum bambergeri		+	01						+					+														
Hypnum sp.																												
Meesia sp.																												
Meesia uliginosa																												
Mnium sp.																												
Paludella squarrosa														+		+	+											
Plagiomnium medium																+	+											
Pleurozium schreberi																												
Pogonatum urnigerum											+																	
Pohlia andrewsii													+															
Pohlia crudoides											+																	
Pohlia elongata											+																	
Pohlia nutans			+						+					+	+	+	+		+								+	
Pohlia sp.																												
Politrichastrum alpinum																						02						
Polytrichaceae family																												
Polytrichum commune																									05	+		
Polytrichum hyperboreum												+							05	+			02	+				

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Polytrichum longisetum													03															
Polytrichum piliferum				02							+	01							+		+	+	+					
Polytrichum sexangulare																												
Polytrichum sp.					05	+	05	01												10								
Polytrichum strictum		01	02	+					02	02	+	01		05	+	+	+			+	05			05	10	02	+	01
Polytrichum swartzii																												
Pseudobryum cinclidioides																												
Ptilium cristum-castrensis																						+						
Rhacomitrium lanuginosum		+		01			+	01		05	+	01								+	01				10	05		
Rhizomnium andrewsianum																												
Rhytidium rugosum												+											03					
Sphagnum angustifolium									05					20	10	10	05											
Sphagnum aongstroemii																												
Sphagnum balticum																												01
Sphagnum compactum																												
Sphagnum fimbriatum	+																											
Sphagnum girgensohnii			+										15															
Sphagnum imbricatum	05																											
Sphagnum lenense									05																			
Sphagnum lindbergii	20																	05										
Sphagnum magellanicum																												
Sphagnum nemoreum																												
Sphagnum obtusum																												
Sphagnum orientale																												
Sphagnum rubellum	+		01						05				02	10	35	10	05										10	20
Sphagnum sp.									05									05										
Sphagnum squarrosum																												
Sphagnum subsecundum																												
Sphagnum teres																												10
Sphagnum warnstorfii																									+			
Sphachnaceae																												
Splachnum sphaericum	+																											
Tetraplodon pallidus																				-								
Thuidium abietinum		+																				02						
Tomenthypnum nitens		+	+										+	+		+						01					+	+
Tortula ruralis		20																	01									
Unknown moss																			03		+							+

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Liverworts																												
Anastrophyllum minutum		+	+	+	+		+		+	+	+			+	+				+	+					+		+	+
Aneura pinguis		+																										
Blepharostoma trichophyllum brevirete	+						+		+					+	+												+	+
Calypogeia sp.																												
Cephaloziella sp.																												
Chandonanthus setiformis		+																			02			+	+			
Diplophyllum albicans																												
Diplophyllum opacifolia																												
Gymnomitriom coninnatum																												
Gymnomitriom sp.																												
Lophozia binsteadii																											+	
Lophozia guttulata																			+	+	+				+			
Lophozia quadriloba																												
Lophozia sp.					+								+															
Macrodiplophyllum plicatum																												
Mylia anomala																												
Pseudolepicola fryei																												
Ptilidium ciliare		+	+						+					+	+							01					+	+
Radula prolifera		+																				+						
Scapania paludicola	+																											
Scapania simsonii		+																										
Tritomaria quinquedentata	+		+						+					+	+												+	+
Unknown leafy liverwort																+	+											+
Unknown thalloid liverwort																												
Lichens																												
Fruticose																												
Alectoria nigricans		+					+	+			+	15							02	+		+	05		+			
Alectoria ochroleuca		01		03	02	+	+	+				03							03	03			02	07	05	+	+	
Baeomyces sp.																						+						
Cetraria andrejevii					+					+	+	+								+								
Cetraria commixta																												
Cetraria cucullata		05	+	05	10		02	+	+	02	+	+		+					05	05		10	+	05	10	+	02	+
Cetraria delisei																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Cetraria fastigiata																												
Cetraria hepatizon																												
Cetraria inermis									+																			
Cetraria islandica		+	+	+	01		+	+	+			+							01	01	01	05	++	+	+	+	+	
Cetraria kamczatica		+					+													+				++	+			
Cetraria laevigata										+	+																	
Cetraria nigricans				+						+	+	+											+					
Cetraria nivalis		25	+	10	05	+	03	+		+	+	+							20	25	+		05	15	01	+		
Cetraria pinastri																												
Cetraria richardsonii		+			+	+	+	+	+	+	+	+							+	+	+	+	01	01	+	+		
Cetraria sepincola																												
Cetraria sp.																												
Cetraria tilesii																												
Cladonia alaskana												05																
Cladonia amaurocraea		+	+	+	+		+	+	+	+	+	+							+	+	+		+	+	+	+	01	+
Cladonia arbuscula		10	01				10	+	+	+	+								+	10	25	15	01	+	05	+		
Cladonia carneola																												
Cladonia cenotea																												
Cladonia chlorophaea							01	+												+		+						
Cladonia coccifera					+				+	+	+								+	+	+	+	+					
Cladonia cornuta																				+								
Cladonia deformis																				+								
Cladonia ecomocyna																												
Cladonia fimbriata																												
Cladonia gracilis		+	+	+	02		03	+	+	02	+			+					02	02	07	05	+	+	+	+	+	
Cladonia macrophylla																			+		+			+				
Cladonia mitis					05	+				+	+								+									
Cladonia pleurota																			+	+	+	+		+				
Cladonia pocillum												+																
Cladonia pyxidata																												
Cladonia rangiferina		10	01		15		25	+	+	20	+			+						05	25	05	+	01	15	+	05	
Cladonia spp.				+					+	10		05							05	+	06	-	++	+	+	+	01	
Cladonia stellaris																												
Cladonia subulata																												
Cladonia sulphurina																												
Cladonia uncialis		+			+		+	+		+	+	+							+	+	+	+	01	+	+			
Cornicularia aculeata												+																

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Cornicularia divergens				10								10							05	02			15	07	+			
Dactylina arctica		+	+		01		01	+	+	+	+	+							+	+			+	+	+	+	+	
Dactylina beringica																					++	-		+				
Dactylina ramulosa		+	+						+																			
Lobaria linita																							+					
Pseudephebe pubescens				15																								
Sphaerophorus fragilis				05																								
Sphaerophorus globosus		01			+		+	+		+		03							07	05			01	10	10	+		
Stereocaulon paschale							+																					
Stereocaulon tomentosum		+			+		+			+	+	+							+	+	01	01	01	01				
Thamnolia spp.		+	+	+	+	+	+	+		+	+	+							+	+	+	+	+	01	+	+	+	
Foliose																												
Asahinea chrysantha				+	+	+	+	+				01							+	+			02	+	+	+		
Asahinea scholanderi				+																								
Hypogymnia subobscura				05								+											01					
Nephroma arcticum					+		+	+	+												01							
Nephroma expallidum																							+					
Ochrolechia upsaliensis																												
Parmelia omphalodes				+															+									
Parmelia septentrionalis																												
Parmelia stygia																												
Parmelia sulcata																												
Peltigera aphthosa		+			+		+		+	+		+		+									+		+	+	+	
Peltigera canina																												
Peltigera horizontalis																											+	
Peltigera leucophlebia																						-						
Peltigera malacea																												
Peltigera polydactyla																												
Peltigera scabrosa			+				+	+	+					+														
Peltigera sp.					+		+			+									+	+	+		+	+				
Solorina bispora																												
Solorina crocea					+																							
Solorina saccata																												
Solorina sp.				+								-																
Umbilicaria caroliniana																												
Umbilicaria hyperborea																			+		+							

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	25B	26	27	28	29A	29B	30A	30B	31	32A	32B	33	34	35A	35B	36A	36B	37	38	39	40	41	42	43	44A	44B	45	46
Umbilicaria proboscidea				+																								
Umbilicaria sp.												+																
Crustose																												
Caloplaca jungermanniae																												
Caloplaca sp.																												
Candelariella sp.																												
Dermatocarpon lachneum																												
Haematomma lapponicum																			+									
Lecanora epibryon																												
Lecanora sp.																												
Lecidea demissa																							+					
Lecidea flavocaerulescens												+									+							
Lecidea sp.																					+							
Mycoblastis sanguinarius																							+					
Ochrolechia frigida																												
Ochrolechia sp.																				+	+							
Pertusaria bryontha												+																
Pertusaria dactylina		+					+	+	+	+	+	+							+	+			01		+	+		
Pertusaria panygra				+						+	+											+						
Pertusaria sp.																					+							
Polyblastia gelatinosa																										05		
Psoroma hypnorum												+							+		+	+						
Rhizocarpon geographicum				01								+							+	+	+							
Rinodina turfacea																												
Unknown crustose lichen												+											+	05				
Xanthoria centrifuga																												
Xanthoria separata				+								+							+				01					

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Vascular Plants																												
Shrubs																												
Andromeda polifolia																												
Arctous alpina					25									02	15													
Betula nana exilis		60		05					+	01				+		02	07					25						
Cassiope tetragona tetragona									40	35	40			55		01	02		+			02		+	+			
Diapensia lapponica ssp. *obovata*									+		05																	+
Dryas intergrifolia integrifolia														20														
Dryas octopetala octopetala					+	45	35	40				70		+	10													
Empetrum hermaphroditum				+					04							01												
Ledum palustre decumbens		+		01					10	01	02					01	03					25						
Loiseleuria procumbens																												
Potentilla palustris	+																			+								
Rhododendron lapponicum														+														
Rubus chamaemorus		+		01												03	01					20						
Salix arctica														+														
Salix chamissonis	30		01																				20					+
Salix fuscescens	01																											
Salix phlebophylla					01	02	+			+	03														+			
Salix planifolia pulchra	05	05	55	10						10	+					25	15										+	
Salix reticulata reticulata			+	02						+				03		+												
Salix rotundifolia rotundifolia									05	02																	30	70
Vaccinium uliginosum				+	40				04		25			15	40				+									
Vaccinium vitis-idaea minus		10		10	05				30	15	10				05	05	03					15			+			
Graminoids																												
Arctagrostis latifolia																							+				+	01
Calamagrostis canadensis canadensis																							70					
Calamagrostis inexpansa	+								+	02																		
Carex aquatilis s.l.	45		25																									
Carex bigelowii		20		10										+		10	05										+	
Carex microchaeta									03	01	++			+	01													03
Carex misandra															+													
Carex obtusata						+	+																					
Carex podocarpa																											+	
Carex rariflora	++																											

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Carex rotundata																												
Carex rupestris												+	+															
Carex saxatilis laxa																												
Carex scirpoidea														01														
Carex vaginata																												
Eriophorum angustifolium s.l.																								+				
Eriophorum angustifolium subarcticum	+		10																									
Eriophorum russeolum			-																									
Eriophorum scheuchzeri scheuchzeri																												
Eriophorum vaginatum				40												45	45					03				05		
Festuca altaica															+								+					
Festuca sp.							+					+	+															
Hierochloe alpina					++				++						01			-	+									+
Juncus biglumis																								01	01	07		
Kobresia myosuroides						01	01	01						+	+													
Luzula arctica										01	++													01	+			
Luzula confusa									-																		+	+
Luzula sp.															+													
Luzula wahlenbergii																												
Poa arctica	+	++		+	+					+									+								+	++
Poa glauca						+	+	+							+													
Poa lanata															+													
Poa pauspicula																											+	++
Poa sp.																												
Trisetum spicatum spicatum						+																						
Unknown graminoid											+	+																
Forbs, Horsetails, Ferns, Clubmosses, Spikemosses																												
Acomastylis rossii														++														
Aconitum delphinifolium delphinifolium																											++	+
Anemone drummondii							01																					
Anemone parviflora	+																											+
Anemone sp.						+																	+					
Antennari alpina var. *media*						+	+	+																				
Arnica frigida																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Arnica lessingii						01																					+	02
Artemisia arctica arctica	-				+	02									+				+				+				+	01
Astragalus umbellatus														++														
Bistorta plumosa	-	++		+	+				+	01	01			01	+	++	+						+					
Bistorta vivipara	+		+							+				+										+	+			+
Bupleurum triradiatum						01	+																					
Campanula lasiocarpa																												
Cardamine pratensis angustifolia																												
Douglasia ochotensis							++	+				+	+															
Draba sp.							+	+				+																
Equisetum arvense														+														++
Equisetum scirpoides														+														
Equisetum variegatum variegatum														+														
Erigeron muirii							++																					
Eritrichum aretioides							+																					
Gentiana glauca																												
Hippuris vulgaris																				+								
Huperzia selago ssp. *appressa*									+	+	+																	+
Minuartia arctica																												
Minuartia obtusiloba						++	++	+				+	+															
Novosieversia glacialis											03			01														
Orthilia secunda ssp. *obtusata*																												
Oxytropis nigrescens s.l.						+	+	03				+	+															
Oxytropis sp.							+																					
Papaver macounii														++														
Parrya nudicaulis s.l.										++	+			+														
Pedicularis albolabiata	+																											
Pedicularis capitata					+	+				++	+			++	++													++
Pedicularis kanei kanei					+				+	+	+																	
Pedicularis labradorica																	+											
Pedicularis langsdorfii																												
Pedicularis lapponica																												
Petasites frigidus	+	01	+	+							++					++	+						+	+				01
Phlox sibirica sibirica						+	+																					
Polemonium acutiflorum			+																				02				+	+
Potentilla uniflora						+	+																					

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Pyrola grandiflora				+					++	03	03					++	++											
Ranunculus sp.																												+
Saussurea angustifolia														+														
Saxifraga bronchialis funstonii						+		-	+																		+	
Saxifraga cernua	+																+											
Saxifraga foliolosa																												
Saxifraga nelsoniana	+	+	+	+					+	++	++			+	-	+	+										+	+
Saxifraga nivalis						02	+					+			-												+	
Saxifraga rivularis																											++	
Saxifraga tricuspidata						+	+																					
Selaginella sibirica						01	01	++				+	+															
Senecio atropurpureus frigidus				+			-		++	+	+					+												
Silene acaulis																											+	
Smelowskia calycina						+	++	+				+	+															
Sparganium hyperboreum																				40	70							
Stellaria longipes					+									+	+								+					+
Tofieldia pusilla																												
Unknown dicot	+							+		+																		
Valeriana capitata	+		02													++							++					
Bryophytes																												
Mosses																												
Aulacomnium palustre	15	05	10	05													01						+					
Aulacomnium turgidum		20		20					20	20	20					20	20					15	+					
Brachythecium groenlandicum																												
Brachythecium sp.																												
Brachythecium turgidum																												
Bryum algovicum																												
Bryum pseudotriquetrum	02		01																									
Bryum sp.		+							+					+														
Calliergon giganteu																												
Calliergon sarmentosum		05																			+							
Calliergon sp.																											+	
Calliergon stramineum																												
Campylium stellatum	+																											
Ceratodon purpureus																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Cirriphyllum cirrosum																												
Cynodontium sp.						02																						
Dicranella sp.																												
Dicranella varia																												
Dicranum acutifolium									15	+	+			+	01			+	+									
Dicranum angustum		05		05										05		05	05											
Dicranum elongatum		05		15						05	10				01							+						
Dicranum groenlandicum																05						+						
Dicranum muelenbeckii								+	10																			
Dicranum scoparium										+	+																	
Dicranum sp.					05					05	20			03								50						++
Drepanocladus badius																	+											
Drepanocladus revolvens																	+											
Drepanocladus sp.																												
Drepanocladus uncinatus	35		30								+						+						25				50	20
Encalypta brevicolla																												
Encalypta rhaptocarpa						05	02																					
Hylocomium splendens obtusifolium		70	20	10					50	80	20			+		15	10					10	25					+
Hypnum bambergeri				+					+							+												
Hypnum sp.											01			+														
Meesia sp.																												
Meesia uliginosa																	+											
Mnium sp.	+									+																		
Paludella squarrosa	01		05																		+							
Plagiomnium medium																												
Pleurozium schreberi																												
Pogonatum urnigerum							01		01	02	03																+	
Pohlia andrewsii																												
Pohlia crudoides																												
Pohlia elongata																												
Pohlia nutans																+												
Pohlia sp.																												
Politrichastrum alpinum	01								01										+								+	10
Polytrichaceae family																		+										
Polytrichum commune																												
Polytrichum hyperboreum																												

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Polytrichum longisetum																												
Polytrichum piliferum							+	++	01			+															++	
Polytrichum sexangulare																											+	
Polytrichum sp.																												
Polytrichum strictum		05		01	15	01									05	05	10		+			02						
Polytrichum swartzii																					+							
Pseudobryum cinclidioides			05																									
Ptilium cristum-castrensis										+																		
Rhacomitrium lanuginosum									05		10	+						05	01								+	
Rhizomnium andrewsianum																												
Rhytidium rugosum					05	05			05	01	03			05	30													
Sphagnum angustifolium																	05											
Sphagnum aongstroemii										+	+																	
Sphagnum balticum		+		01												01						01						
Sphagnum compactum																												
Sphagnum fimbriatum	05																											
Sphagnum girgensohnii									01		02																	
Sphagnum imbricatum																												
Sphagnum lenense											01																	
Sphagnum lindbergii																												
Sphagnum magellanicum																												
Sphagnum nemoreum																												
Sphagnum obtusum																				+								
Sphagnum orientale																												
Sphagnum rubellum	01	+	02	02						+						05	10					01						
Sphagnum sp.										+										07								
Sphagnum squarrosum																				+	+							
Sphagnum subsecundum																												
Sphagnum teres		+								+	01					01	10											
Sphagnum warnstorfii	01		01																									
Sphachnaceae																												
Splachnum sphaericum																												
Tetraplodon pallidus																												
Thuidium abietinum																												
Tomenthypnum nitens	01		05	+						+				05		05	05											
Tortula ruralis																												
Unknown moss	+			+					+	+		+				+	+										05	+

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Liverworts																												
Anastrophyllum minutum		01		01						+	+					01											+	+
Aneura pinguis	+																											
Blepharostoma trichophyllum brevirete		+									+					+	02											
Calypogeia sp.																												
Cephaloziella sp.																												
Chandonanthus setiformis									+		+							10	02								+	
Diplophyllum albicans																												+
Diplophyllum opacifolia																												+
Gymnomitriom coninnatum										+																		
Gymnomitriom sp.												+															+	
Lophozia binsteadii																+												
Lophozia guttulata		+																										
Lophozia quadriloba	+																											
Lophozia sp.																												
Macrodiplophyllum plicatum											+																	
Mylia anomala																												
Pseudolepicola fryei											+																	
Ptilidium ciliare														07		+	10					01						
Radula prolifera														+														
Scapania paludicola																												
Scapania simsonii																												
Tritomaria quinquedentata	+																+						+					
Unknown leafy liverwort	+		+	01					+						+	+												
Unknown thalloid liverwort						+																						
Lichens																												
Fruticose																												
Alectoria nigricans				+				+				+	+					+	+			+						
Alectoria ochroleuca							+	++		+	+	10	+	+		+		05	05			+						
Baeomyces sp.									+																		+	
Cetraria andrejevii																												
Cetraria commixta												05	05															
Cetraria cucullata		01		01	20	05	+	+	05	01	05	+	+	05	15	++	+	+				05						
Cetraria delisei																												01
Cetraria fastigiata																	+											

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Cetraria hepatizon																			02									
Cetraria inermis																												
Cetraria islandica		+		+	+	+	+	+	++	++	+	+	+	03	+	+	+	+	+			+						+
Cetraria kamczatica											+																++	
Cetraria laevigata																												
Cetraria nigricans							+											20	03									
Cetraria nivalis		+		+	01	08	05	01	05	+	+	+	+	05	+			01	+									
Cetraria pinastri																												
Cetraria richardsonii					01	+			01	01	01			05	+													++
Cetraria sepincola																												
Cetraria sp.																												
Cetraria tilesii													+															
Cladonia alaskana															+													
Cladonia amaurocraea				01	03	+		+	01	++	02			+	+	+	+	+	01			10						
Cladonia arbuscula				+	10				20		20			+	++	+		01	01									
Cladonia carneola				+																								
Cladonia cenotea				+																		+						
Cladonia chlorophaea					+																						+	+
Cladonia coccifera															+			+										
Cladonia cornuta																												
Cladonia deformis				+																								
Cladonia ecomocyna																						+					+	
Cladonia fimbriata																												
Cladonia gracilis		++			05				03	03	05			+	+	+	+	01	01			05					+	
Cladonia macrophylla		+																										
Cladonia mitis				+										+	++							10						
Cladonia pleurota		+														+			+			+						
Cladonia pocillum																												
Cladonia pyxidata					01	+													+									
Cladonia rangiferina		+		01	15				02	04	20			+	+	+	+	01	03			20			+			
Cladonia spp.		+		+	+	+	+	++	+	+	+	+				+	+	+	+			+			+		++	
Cladonia stellaris											01																	
Cladonia subulata		+																										
Cladonia sulphurina																												
Cladonia uncialis				+				+			01						+	+	+								+	
Cornicularia aculeata							+	+																				
Cornicularia divergens						+	05	03		+		10	02					10	10									

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Dactylina arctica		+		+	+				01	++	++			05		++	+		+			01						
Dactylina beringica																		+										
Dactylina ramulosa									+	+	+			+					+									
Lobaria linita																												
Pseudephebe pubescens							+																					
Sphaerophorus fragilis							+																					
Sphaerophorus globosus								+	+		+	01	+					03	+									
Stereocaulon paschale																												
Stereocaulon tomentosum					05	01	01	01	01	+	++			+	10											05	02
Thamnolia spp.				+	+	01	06	05	+	++	+	05	01	05	05			+	+			+		+	+			
Foliose																												
Asahinea chrysantha							+	+	+	-		05	+	+														
Asahinea scholanderi																												
Hypogymnia subobscura							01	++					+															
Nephroma arcticum									++	++	+			+														
Nephroma expallidum									++																		++	
Ochrolechia upsaliensis						+	01					05	+															
Parmelia omphalodes								+		+		+	+					+	01									
Parmelia septentrionalis																												
Parmelia stygia																		+										
Parmelia sulcata																			02									
Peltigera aphthosa		++		++		+		-	01	++	++	+				++											+	
Peltigera canina						+	+																					
Peltigera horizontalis																												
Peltigera leucophlebia																												
Peltigera malacea					01										+													
Peltigera polydactyla																												
Peltigera scabrosa		+		+												++	+											
Peltigera sp.									+	+																		
Solorina bispora							+	-																				
Solorina crocea																											+	
Solorina saccata														+														
Solorina sp.																												
Umbilicaria caroliniana																		01										
Umbilicaria hyperborea												+	+						05									
Umbilicaria proboscidea																		05	05									

Table 8. R4D permanent study plot vegetation data, species cover (percent), sorted by growth form

Plot No.	47	48	49	50	51	52	53	54	55	56	57	58A	58B	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
Umbilicaria sp.																												
Crustose																												
Caloplaca jungermanniae						+																						
Caloplaca sp.														+														
Candelariella sp.								+																				
Dermatocarpon lachneum								+																				
Haematomma lapponicum																		+										
Lecanora epibryon							01																					
Lecanora sp.							+																					
Lecidea demissa																											+	
Lecidea flavocaerulescens																		01	02									
Lecidea sp.																												
Mycoblastis sanguinarius																												
Ochrolechia frigida																		+										
Ochrolechia sp.																												
Pertusaria bryontha																												
Pertusaria dactylina							+				+																	
Pertusaria panygra																												
Pertusaria sp.												01	+															
Polyblastia gelatinosa																												
Psoroma hypnorum											+	+							+								+	
Rhizocarpon geographicum												+	+					20	02									
Rinodina turfacea								+																				
Unknown crustose lichen							+		+	+		+	01					10	25			+						
Xanthoria centrifuga																		05	10									
Xanthoria separata							+	+				+	+						+									

Appendix 1. Plot and Soil Photos

SW-1 SW-2 SW-3 SW-4 SW-5 SW-6

Soil photo






General plot photo






SW-7 SW-8 SW-9 SW-10 SW-11 SW-12

Soil photo





General plot photo






Appendix 1. Plot and Soil Photos

SW-13

Soil photo

General plot photo

SW-14

SW-15

SW-16

SW-17

SW-18

SW-19

Soil photo

General plot photo

SW-20

SW-21

SW-22

SW-23

SW-24

SW-25

Soil photo

General plot photo

SW-26

SW-27

SW-28

SW-29a

SW-29b

SW-30a

Soil photo

General plot photo

SW-30b

SW-31

SW-32a

SW-32b

SW-33

Appendix 1. Plot and Soil Photos

SW-34

SW-35

SW-36

SW-37

SW-38

SW-39

Soil photo

General plot photo

SW-40

SW-41

SW-42

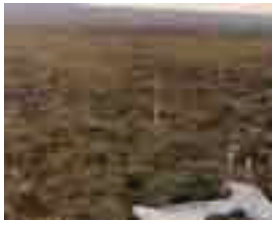
SW-43

SW-44

SW-45

Soil photo

General plot photo



Appendix 1. Plot and Soil Photos

SW-46

Soil photo

General plot photo

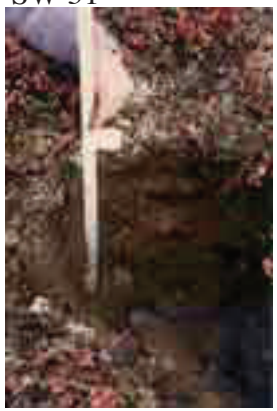
SW-47

SW-48

SW-49

SW-50

SW-51



SW-52

Soil photo

General plot photo

SW-53

SW-54

SW-55

SW-56

SW-57

Appendix 1. Plot and Soil Photos

SW-58

Soil photo

General plot photo

SW-59

SW-60

SW-61

SW-62

SW-63

SW-64

General plot photo

SW-65

SW-66

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Dry Dryas octopetala, Selaginella sibirica dwarf-shrub, fruticose-lichen tundra	Dry, non-tussock sedge, dwarf shrub, fruticose lichen type (D1)	Dryas dwarf shrub tundra	Dryas fell-field					Salicetum phlebophyllae	Salix phlebophylla type	Dryas tundra [2.D.(1)a.]	
Dry Dryas octopetala, Vaccinium vitis-idaea dwarf-shrub, fruticose-lichen tundra		Lichen dwarf shrub tundra, also Dryas dwarf shrub tundra	Dryas fell-field							Dryas tundra [2.D.(1)a.]	Dryas octopetala-Vaccinium spp. (Talbot 1984; Jorgenson 1984; Racine and Young 1978)
Dry Arctous alpina, Hierochloe alpina dwarf-shrub, fruticose-lichen tundra		Lichen Dwarf shrub tundra		Alpine bearberry-mountain cranberry type	Diapensia lapponica, Alectoria spp. evergreen dwarf scrub		Vaccinio uliginosi-Salicetum	Salicetum phlebophyllae phlebophyllae	Salix phlebophylla type	Bearberry tundra [2.D.(2)a.]	Arctostaphylos alpina-Vaccinium vitis-idaea (Hanson 1953) Arctostaphyllos alpina-Vaccinium spp. -Empetrum nigrum-Cassiope tetragona-lichens (Jorgenson 1984)

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Dry Vaccinium uliginosum, Arctous alpina dwarf shrub, fruticose-lichen tundra		Lichen Dwarf shrub tundra						Vaccinio-Betuletum glandulosae		Vaccinium tundra [2.D.(2)b.]	Vaccinium spp.-Ledum palustre-Arctostaphylos alpina-Cassiope tetragona (Johnson et al. 1966; Hanson 1958), Vaccinium uliginosum-V. vitis idaea (Bettinger and Janz 1974), Vaccinium uliginosum-Empetrum nigrum-Ledum palustre-Cladonia spp. (Steiger et al. 1983)
Dry Cassiope tetragona, Dryas integrifolia dwarf-shrub, fruticose-lichen tundra			Ericaceous snow-bed community	Heather-blueberry-moss type	Cassiope tetragona, Dryas integrifolia evergreen dwarf scrub		Cassiopo tetragonae-Dryadetum alaskensis		Dryas-Carex scirpoidea type	Cassiope tundra [2.D.(2)e.]	Cassiope tetragona-Dryas integrifolia (Komarkova and Webber 1978; Koranda 1960)
Dry Festuca altaica, Carex microchaeta grass, fruticose-lichen tundra										Midgrass-shrub [3.A.(1)c.]	
Dry Cassiope tetragona, Calamagrostis inexpansa dwarf-shrub, fruticose-lichen tundra			Ericaceous snow-bed community	Heather-blueberry-moss type	Diapensia lapponica, Alectoria spp. evergreen dwarf scrub			Betulo-Ledetum decumbentis, Facies cassiopeetrum tetragonae		Cassiope tundra [2.D.(2).]	

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Moist Cassiope tetragona, Hylocomium splendens dwarf-shrub, fruticose-lichen tundra			Ericaceous snow-bed community	Heather-blueberry-moss type						Cassiope tundra	Cassiope tetragona-Vaccinium vitis-idaea-Carex bigelowii-Hylocomium splendens-lichens (Jorgenson 1984)
Moist Salix rotundifolia, Saxifraga rivularis dwarf-shrub, fruticose-lichen tundra										Willow tundra [2.D.(3)a.]	Salix rotundifolia (Klein 1958: Komarkova and Webber 1978; White et al. 1975) Salix rotundifolia-Oxyria digyna (Anderson 1974)
Moist Juncus biglumis, Luzula arctica barren											
Moist Carex bigelowii, Dryas integrifolia nontussock-sedge, dwarf-shrub tundra		Bigelow's sedge dwarf shrub tundra								Sedge-Dryas tundra [3.A.(2) j.]	Carex bigelowii-Dryas integrifolia (Childs 1969; Bettinger and Janz 1974; Webber et al. 1978)

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R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Moist Eriophorum vaginatum, Sphagnum spp. tussock-sedge, dwarf-shrub tundra	Moist Eriophorum vaginatum-Ledum decumbens-Betula nana-Rubus chamaemorus-fruticose lichen tussock sedge, dwarf shrub, fruticose lichen type (M12A)	Cottongrass tussock-dwarf shrub tundra, also Cottongrass-Bigelow's sedge tussock-dwarf shrub tundra	Eriophorum tussock	Cottongrass-sedge-dwarf heath shrub complex	Eriophorum vaginatum seasonal short grass	Eriophorum tussock-dwarf shrub heath subtype		Betulo-Eriophoretum vaginati, Facies eriophoretosum vaginati, also salicetosum reticulatae	Betula glandulosa-Eriophorum type, also Eriophorum vaginatum type	Mixed shrub-sedge tussock tundra [2.C.2(a).] tussock tundra [3.A.(2)d.]	Eriophorum vaginatum-Betula nana-Ledum palustre-Vaccinium spp.-Carex bigelowii (Churchill 1955; Hopkins and Sigafoos 1951; Racine 1977; Viereck 1966; Young and Racine 1977; Racine and Anderson 1979; Brock and Burke 1980; Nodler et al. 1978)
Moist Carex bigelowii, Sphagnum spp. nontussock-sedge, dwarf-shrub tundra	Moist non-tussock sedge, dwarf shrub, fruticose lichen type (M3)	Bigelow's sedge tussock-dwarf shrub tundra	Carex bigelowii high center polygon			Carex-dwarf shrub heath type				Mixed shrub-sedge tussock tundra [2.C.(2)a.] Sedge-willow tundra [3.A.(2)h.]	Carex bigelowii-Betula nana-Salix planifolia-Ledum palustre-Vaccinium spp. (Racine and Anderson 1979; Racine and Young 1978) Carex bigelowii-Salix planifolia (Bettinger and Janz 1974, Johnson et al. 1966, Koranda 1960)

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Moist Betula nana, Rubus chamaemorus dwarf shrub, moss tundra	Moist Petasites frigidus-Rubus chamaemorus-Ledum decumbens-Betula nana-(Empetrum nigrum)-moss spp. forb, dwarf shrub moss type (M11b)			Cloudberry-dwarf shrub-marsh type, also sedge-Sphagnum-moss marsh	Betula nana, Rubus chamaemorus, Sphagnum spp. open deciduous dwarf scrub			Betulo-chamaemoretum		Shrub-birch ericaceous [2.C.(2).d.]	Betula glandulosa-Vaccinium vitis-idaea-Rubus chamaemorus-Sphagnum spp. (Bos 1967; Dachnowski-Stokes 1941; Drew and Shanks 1965; Fries 1977; Hanson 1953; Hogan and Tande 1983; Johnson et al. 1966; Jorgenson 1984; Komarkova and Webber 1978; Racine 1976; Racine and Anderson 1979; Rigg 1914; Steiger et al. 1983; Tande 1983; Webber et al. 1978; Young and Racine 1978)
Moist Betula nana low-shrub tundra (includes numerous birch low shrub stand types)				Dwarf birch-heath-lichens type				Betulo-Ledetum decumbentis, Facies betulo-ledetosum decumbentis	Betula-Ledum type	Shrub birch-willow [2.C.(2) f.]	

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Moist Salix planifolia ssp. pulchra low-shrub tundra (includes numerous diamond-leafed willow low shrub stand types)		Low-medium willow shrub thicket		Greenleaf willow type						Willow [2.C.(1) b.] also shrub birch-willow [2.C.(1)c.]	
Wet Salix fuscescens, Sphagnum lenense sedge, dwarf-shrub, moss tundra	Wet Carex rariflora-Betula nana-Salix fuscescens-brown Sphagnum non-tussock sedge, dwarf shrub moss type (W4b)							Caricetum rariflorae		Wet sedge meadow tundra [3.A.(3)a.]	
Wet Carex aquatilis, Salix fuscescens sedge, dwarf-shrub, moss tundra	Wet Carex aquatilis-Sphagnum spp. sedge, moss type (W3e), also Wet Carex aquatilis-Eriophorum russeolum-Ledum decumbens-brown Sphagnum non-tussock sedge, dwarf shrub, moss type (W4a)		Eriophorum-Carex wet meadow					Caricetum aquatilis, Facies salicosum arbutifoliae	Carex aquatilis type	Wet sedge meadow tundra [3.A.(3)a]	
Wet Salix planifolia ssp. pulchra, Eriophorum angustifolium low-shrub, sedge tundra	Wet Salix planifolia low shrub type (W13a)							Eriophoretum angustifolii, Facies salicosum pulchrae, also salicetum pulchrae, Facies betulosum glandulosae		Low willow [2.C.(1)b.]	

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Wet Carex rotundata, Sphagnum lindbergii sedge tundra				Sedge-Sphagnum-moss marsh				Eriophoretum scheuchzeri		Wet sedge meadow tundra [3.A.(3)a.]	
Wet Carex aquatilis, Eriophorum angustifolium sedge tundra		Water sedge wet meadow, also tall cottongrass wet meadow	Eriophorum-Carex wet meadow	Sedge marshes	Carex aquatilis seasonal short grass	Carex aquatilis marsh type		Eriophoretum angustifolii, Facies eriophorosum angustifolii, also Caricetum aquatilis, Facies caricosum aquatilis		Wet sedge meadow tundra [3.A.(3)a.]	Carex aquatilis-Eriophorum angustifolium (Batten 1977; Bergman et al. 1977; Childs 1969; Hopkins and Sigafoos 1951; Porter 1966; Spetzman 1959; Racine 1977, 1978)
Aquatic Carex aquatilis, Eriophorum angustifolium sedge marsh		Water sedge wet meadow, also tall cottongrass wet meadow	Eriophorum-Carex wet meadow	Sedge marshes, also aquatic types	Carex aquatilis seasonal short grass			Eriophoretum angustifolii, Facies eriophorosum angustifolii, also Caricetum aquatilis, Facies caricosum aquatilis		Wet sedge meadow tundra [3.A.(3)a.]	Carex aquatilis-Eriophorum angustifolium (Batten 1977; Bergman et al. 1977; Childs 1969; Hopkins and Sigafoos 1951; Porter 1966; Spetzman 1959; Racine 1977, 1978)
Aquatic Sparganium hyperboreum, Hippuris vulgaris forb marsh		Aquatic meadow	Aquatic community	Aquatic types						Burreed [3.D.(1)d.]	Sparganium hyperboreum (Johnson et al. 1966; Murray 1974; Spetzman 1959; Heusser 1960)

Appendix 3. Approximate equivalent vegetation units in several northern Alaska and northwestern Canadian studies

R4D Community Types or Subtypes	Yukon Delta	Chukchi-Imuruk	Cape Thompson	NW Alaska	Atkasook	Umiat	Arrigetch Peaks	Yukon	Yukon, N.W.T.	Alaska Statewide Classification	Alaska Statewide Classification
Walker (1987, Level C)	Tande and Jennings (1986)	Racine and Anderson (1979)	Johnson et al. (1966)	Hanson (1953)	Komarkova and Webber (1980)	Churchill (1955)	Cooper (1986)	Lambert (1968)	Ritchie (1984)	Viereck et al. Level IV (1986)	Viereck et al. Level V (1986)
Aquatic Arctophila fulva grass marsh	Wet Arctophila fulva-(Hippuris tetraphylla) grass forb type (W5a)	Aquatic meadow	Aquatic community		Arctophila fulva seasonal short grass			Arctophiletum fulvae		Fresh grass marsh [3.A.(3) e.]	Arctophila fulva (Batten 1977; Bergman et al. 1977; Britton 1967; Childs 1969; Clebsch 1957; Hulten 1966; Komarkova and Webber 1978; Murray 1974; Potter 1972; Racine and Anderson 1979; Rausch and Rausch 1968; Streveler et al. 1973; Webber et al. 1978; Wiggins and Thomas 1962)
Dry Rhizocarpon geographicum, Cetraria nigricans lichen barren		Rock desert		Lichen-moss barrens			Umbilicarietum-pensylvanico-carolinianae			Crustose lichen [3.C.(2)a.]	Umbilicaria spp.-Rhizocarpon spp. (Anderson 1974; Hanson 1953; Kessel and Schaller 1960; Klein 1958; Pegau 1968; Rausch and Rausch 1968; Webber et al. 1978)
Dry Festuca rubra, Poa glauca grass barren				Grassland type						Midgrass herb [3.A.(1)d.]	

Appendix 4. Permanent vegetation plot locations