

**DEPARTMENT OF ENERGY, R4D PROGRAM
DATA REPORT**

**TOOLIK LAKE
PERMANENT VEGETATION PLOTS:**

**Site factors, soil physical and chemical properties,
Plant species, cover photographs,
and soil descriptions**



D.A. Walker and N.C. Barry

**Joint Facility for Regional Ecosystem Analysis,
Institute of Arctic and Alpine Research,
University of Colorado,
Boulder, CO 80309**

December 31, 1991

Table of Contents

Introduction	1
Methods and data summaries	1
Reconnaissance survey, sampling dates, and plot locations	1
Sampling methods	2
Plot size, species cover estimations, and photographs	2
Site factors	2
Soils	2
Field sampling	2
Laboratory analysis	2
Vegetation	2
Acknowledgments	3
References	3

Figures

Figure 1. Plot locations	4
--------------------------	---

Tables

Table 1. Preliminary vegetation classification based on habitat and dominant species and sample numbers for each type	5
Table 2. List of vegetation communities and microsites sampled in 1989	6
Table 3. Legend for the environmental variables	10
Table 4. Environmental data for permanent plots, abiotic data	11
Table 4. Environmental data for permanent plots, biotic data	17
Table 5. Soils data for Toolik lake permanent plots	23
Table 6. Toolik Lake permanent plot species data	40

Appendices

Selected soil descriptions	62
Plot Photos	96

**TOOLIK LAKE PERMANENT VEGETATION PLOTS:
Site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions**

D.A. WALKER AND N.C. BARRY

Introduction

This data report is a summary of environmental, soil, and vegetation information collected from 81 study plots at the Toolik Lake research site, located in the southern Arctic Foothills of the Brooks Range, Alaska (68°37'N, 149°32'W). It brings together for easy reference all the available information collected from the plots. This information is being used for the classification, mapping and analysis of the geobotanical factors in the Toolik Lake and Imnavait Creek region. A separate equivalent data report is available for 71 permanent plots at Imnavait Creek (Walker et al., 1987).

Methods and data summaries

Reconnaissance survey, sampling dates, and plot locations

A reconnaissance survey was conducted in August 1988 to define the primary vegetation types in the Toolik Lake area. Unknown plants were collected and many informal partial relevés were sampled with reference to spectral signatures on a 1:50,000-scale color-infrared photograph. A total of 22 preliminary vegetation types were defined based on habitat and dominant species (Table 1).

Formal relevé sampling for the plots in this data report was done during the period 1-26 August 1989. An attempt was made to sample at least three relevés for each of the types defined in 1988, but this was not possible in all cases (Tables 1 and 2).

The plots were located in homogeneous areas of vegetation using the centralized replicate method of the Braun-Blanquet approach to vegetation classification (Mueller-Dombois and Ellenberg, 1974; Westhoff and van der Maarel, 1978).

Nearly all of the plots are permanently marked. The exception is plot SWT-55. The plots are marked with 48-inch (122-cm) wooden stakes, and aluminum tags at the base of the stakes with the plot numbers. Some of the stakes have broken off since sampling. We intend to replace all of the wooden stakes with tall plastic stakes.

Forty of the plots are located along transects as follows:

1. West-facing toposequence of Itkillik II glacial outwash and retransported hillslope deposits on the south side of Toolik Lake: (from top of hill) SWT-7, 8, 9, 10, and 11.

2. East-facing toposequence of slope that includes Itkillik I and Itkillik glacial till and retransported hillslope deposits on the south side of Toolik Lake: SWT-18, 19, 20, 21, 22, 23, 24, and 77.

3. South-facing toposequence on Itkillik II till and retransported hillslope deposits on the west side of Toolik Lake: SWT-46, 45, 44, 41, 40, 43, 39, 42, 38, and 37. These are in mixed positions on stone-strips and inter-stripe sites. Plots 38 and 37 are in a colluvial basin at the base of the hill.

4. North-facing toposequence on Itkillik II till and retransported hillslope deposits: SWT-48, 47, 49, 50,

51, 52, 53, 54, and 81. Plot SWT-48 is on a ground-squirrel mound, and most of the sequence is through a deep snowbed.²

5. Water-track transect on the south side of Toolik Lake: SWT-80, 32, 35, 75, 78, 27, 79, 36, 73, 74, 64. Plots SWT-80, 35, 74, and 64 are on frost scars.

The remaining plots were located around Toolik Lake to sample the diversity of vegetation types of the region (Figure 1, Table 2).

Sampling methods

Plot size, species cover estimation, and photographs

The plots have no fixed size because our main objective was to obtain a complete species list for each relevé.

Photographs were taken of each plot (see Appendix). Usually photos were taken of (1) the general site, (2) closeup of the vegetation, and (3) closeup of the soil.

Site factors

The site of each plot was described according to the variables listed in Table 3 plus measurements of thaw depth, estimates of cover of bare soil, rocks, and the major plant growth forms. These data are summarized in Table 4.

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. Bulk density and soil moisture samples were taken from the sides of the soil pits or from large soil plugs for the wet soils using a 240-ml soil can.

Laboratory analysis

Laboratory analyses were conducted at the Colorado State University Soil Testing Laboratory, Fort Collins. The laboratory's routine analysis was run on all samples [pH (saturated paste); NO₃ (KCl extract); P, K, Zn, Fe, Cu, Mn (NH₄HCO₃-DTPA extract); lime estimate, texture estimate (by hand); and organic matter (Walkley-Black or ash method). Selected samples were analyzed for cation exchange capacity (C.E.C.); percentage gravel; particle size (hydrometer method), CaCO₃ equivalent; Ca, Mg, Na, K (NH₄OAc extract); and soil moisture retention (field capacity at 1/3 BAR and permanent wilting point at 15 BAR). These methods are described in Page et al. (1982) and Klute (1986). The soils data are in Table 5.

Vegetation

A large area surrounding each plot marker was searched until no new species were encountered. Estimates of vegetation cover used the Braun-Blanquet cover-abundance scale (r = rare; + = common but less than 1 % cover; 1 = 1-5%; 2 = 6-25%; 3 = 25-50%; 4 = 51-75%; 5 = 76-100%). Cover-abundance values are relatively broad subjective classes, and were determined by estimating cover within the general area of the stake. Voucher collections were made for all vascular plants, bryophytes, and lichens occurring in the plot. Vascular plants were verified by Dr. Dave Murray, University of Alaska Herbarium. Bryophytes were verified by Dr. Dale Vitt, University of Alberta. Lichens were verified by Dr. Joanne Flock at the University of Colorado Herbarium. Table 6 contains the raw species data.

Acknowledgments

This work was funded by the Department of Energy's R4D (Response, Resistance, and Resilience to, and Recovery from Disturbance in arctic ecosystems) (Grant No. DEFG02-84ER60242.A006). Curt Westburg, Nancy Auerbach, and Marilyn Walker assisted in the field. Liz Arnold, Diane Andrews, Nan Lederer, Leanne Lestak, and Diane Lorenz assisted with the preparation of this report.

References

- Klute, A. 1986. Methods of soil analysis, Part 1. Physical and mineralogical methods. Agronomy Series, No. 9, American Society of Agronomy, Inc. and Soil Science Society of America, Inc. Madison, WI, 1188 pp.
- Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. New York: John Wiley and Sons, 547 pp.
- Page, A.L., R.H. Miller, and D.R. Keeney (Eds.) 1982. Methods of soil analysis, Part 2. Chemical and microbiological properties. Agronomy Series, No. 9, American Society of Agronomy, Inc. and Soil Science Society of America, Inc. Madison, WI, 1159 pp.
- Soil Survey Staff. 1974. Soil taxonomy of the National Cooperative Soil Survey. Soil Conservation Service, U.S. Department of Agriculture, 754 pp.
- Walker, D.A., N.D. Lederer, and M.D. Walker. 1987. Permanent vegetation plots: site factors, soil physical and chemical properties, and plant species cover. Data report for R4D Program, U.S. Department of Energy.
- Westhoff V. and E. van der Maarel. 1978. The Braun-Blanquet approach. In: Whittaker, R.H. (Ed.) Classification of plant communities. Boston: Junk, pp. 617-726.

Figure 1. Plot location map



Table 1. Preliminary vegetation classification based on habitat and dominant species and sample numbers for each type.

<u>Principal habitat</u>	<u>Preliminary community name</u>	<u>Plots</u>
<i>Dry tundra</i>		
South-facing slopes	<i>Dryas octopetala - Selaginella sibirica</i>	SWT-7, 18, 47*, 60
Outwash terraces and till	<i>Arctous alpina - Hierochloë alpina Vaccinium vitis-ideae - Calamagrostis purpurascens</i> <i>Betula nana - Cladina arbuscula</i> <i>Salix phlybophylla - Vaccinium vilis-ideae</i>	SWT-5*, 46^, 71 SWT-65*, 69 SWT-3, 6, 66, 70* SWT-63
Ground squirrel mounds	<i>Poa glauca - Ranunculus pedatifidus</i>	SWT-17, 48*, 76, 31
Sorted and non sorted stripes	<i>Dryas integrifolia - Dicranum sp.</i>	SWT-40*, 44*
Frost scars	<i>Luzula arctica - Juncus biglumis</i>	SWT-80, 35*, 74, 64
<i>Snowbeds</i>		
Upper snowbeds	<i>Empetrum nigrum - Ledum decumbens</i>	SWT-8^, 19
Middle snowbeds	<i>Cassiope tetragona - Carex micro chaeta</i> <i>Cassiope tetragona - Geum glaciale</i>	SWT-49* SWT-9, 20, 50*
Lower deep snowbeds	<i>Salix rotundifolia - Hylocomium splendens</i>	SWT-51*
<i>Moist tundra</i>		
Water track margins	<i>Betula nana - Sphagnum rubellum</i>	SWT-36, 75*
Minerotrophic slopes	<i>Carex bigelowii - Tomenthypnum nitens</i>	SWT-22, 23, 39*, 42^, 43^, 53*, 56*, 77
Tussock tundra	<i>Eriophorum vaginatum - Sphagnum rubellum</i>	SWT-25, 26*, 32*, 54*, 73^, 81
Lower minerotrophic slopes	<i>Equisetum arvense - Carex bigelowii</i>	SWT-10, 21, 24, 41*, 45*, 52^
Fen hummocks	<i>Tricophorum caespitosum - Tomenthypnum nitens</i>	SWT-14*, 38*, 58*
Stream banks, lake margins	<i>Carex podocarpa - Dodocatheon frigidum</i>	SWT-1, 16, 34*, 62
Riparian willows	<i>Salix lanata - Salix alaxensis</i>	SWT-2*, 28, 33, 67
Shrubby south-facing slopes	<i>Salix glauca</i>	SWT-59, 61*
Stream margins	<i>Salix pulchra - Dodecatheon frigidum</i>	SWT-68*
<i>Wet tundra</i>		
Fens, deeper water	<i>Carex aquatilis - Eriophorum angustifolium</i>	SWT-12, 13*, 29, 72
Fens, shallow water	<i>Carex chordormza - Carex rariflora</i>	SWT-II* 15, 37*, 55, 57*
Water tracks	<i>Salix pulchra - Sphagnum squarrosum</i>	SWT-27*
Lake margins	<i>Arctophila fulva - Hippuris vulgaris</i>	SWT-4, 30*
Water tracks	<i>Salix pulchra - Sphagnum rubellum</i>	SWT-78, 79*

* Plots with soil descriptions and soil analysis for most horizons.

^Plots with soil analysis for most horizons.

All other plots have soil analysis for horizon at 10-cm depth (rooting zone).

Table 2. List of vegetation communities and microsites samples in 1989.

<u>Plot No.</u>	<u>Plant community</u>	<u>Microsite</u>
SWT-1	Moist <i>Carex membranacea</i> , <i>Carex scirpoidea</i> , <i>Salix chamissonis</i> , <i>S. reticulata</i> , <i>Potentilla fruticosa</i> sedge, dwarf-shrub, forb tundra	Featureless active floodplain
SWT-2	Moist <i>Salix alaxensis</i> , <i>Aster sibirica</i> , <i>Calamagrostis canadensis</i> , <i>Potentilla fruticosa</i> tall shrubland	Featureless active floodplain
SWT-3	Dry <i>Betula nana</i> , <i>Ledum palustre</i> ssp. <i>decumbens</i> , <i>Hierochloë alpina</i> , <i>Cladonia arbuscula</i> dwarf-shrub, lichen tundra	Small turf hummocks on footslope
SWT-4	Aquatic <i>Arctophila fulva</i> marsh	Lake, in 20 - 30 cm of water
SWT-5	Dry <i>Arctous alpina</i> , <i>Hierochloë alpina</i> dwarf-shrub, fruticose-lichen tundra	High centered polygons on top of glacial outwash terrace
SWT-6	Dry <i>Betula nana</i> , <i>Hierochloë alpina</i> , <i>Cetraria cucullata</i> low-shrub, fruticose-lichen tundra	High centered polygons on glacial outwash terrace
SWT-7	Dry <i>Dryas octopetala</i> , <i>Selaginella sibirica</i> , <i>Thamnolia subuliformis</i> dwarf-shrub, fruticose-lichen tundra	Featureless. hill crest of outwash terrace
SWT-8	Dry <i>Empetrum nigrum</i> , <i>Betula nana</i> , <i>Vaccinium uliginosum</i> , <i>Loiseleuria procumbens</i> , <i>Cladonia arbuscula</i> , <i>Stereocaulon alpinum</i> dwarf-shrub, fruticose-lichen tundra	Small hummocks and solifluction features on mid slope
SWT-9	Dry <i>Cassiope tetragona</i> , <i>Dryas integrifolia</i> , <i>Hylocomium splendens</i> , <i>Carex microchaeta</i> , <i>Salix glauca</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Snowbed, hummocky terrain, including turf hummocks and some solifluction features on footslope
SWT-10	Moist <i>Carex bigelowii</i> , <i>Cassiope tetragona</i> , <i>Equisetum arvense</i> , <i>Dryas integrifolia</i> , <i>Hylocomium splendens</i> , <i>Tomenthypnum nitens</i> sedge, horse-tail, dwarf-shrub tundra	Stone stripes on footslope
SWT-11	Wet <i>Carex chordorrhiza</i> , <i>Carex rotundata</i> , <i>Scorpidium scorpioides</i> sedge tundra	Wet element of strangmoor in fen of colluvial basin
SWT-12	Wet <i>Carex aquatilis</i> , <i>Eriophorum angustifolium</i> , <i>Carex rotundata</i> sedge tundra	Strangmoor and aligned hummocks in fen of colluvial basin
SWT-13	Wet <i>Eriophorum angustifolium</i> , <i>Carex rotundata</i> , <i>Carex aquatilis</i> sedge tundra	Featureless margin of a small pond in colluvial basin
SWT-14	Moist <i>Trichophorum caespitosum</i> , <i>Tomenthypnum nitens</i> sedge tundra	Strangmoor and aligned hummocks in fen of colluvial basin
SWT-15	Wet <i>Carex chordorrhiza</i> , <i>Carex rotundata</i> sedge tundra	Wet element of strangmoor and aligned hummocks in fen of colluvial basin
SWT-16	Moist <i>Carex membranacea</i> , <i>Salix reticulata</i> , <i>Dodecatheon jrigida</i> sedge, dwarf-shrub, forb tundra	Turf hummocks and solifluction features on footslope at lake margin
SWT-17	Moist <i>Poa glauca</i> , <i>Epilobium angustifolium</i> grass, forb tundra	Ground squirrel dens on hill crest
SWT-18	Dry <i>Dryas octopetala</i> , <i>Carex rupestris</i> , <i>Pertusaria</i> sp. dwarf-shrub, crustose-lichen tundra	Featureless hill crest of moraine
SWT-19	Dry <i>Vaccinium uliginosum</i> , <i>Loiseleuria procumbens</i> , <i>Ledum palustre</i> ssp. <i>decumbens</i> , <i>Betula nana</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Snowbed, featureless shoulder of moraine

SWT-20	Dry <i>Cassiope tetragona</i> , <i>Dryas integrifolia</i> , <i>Geum glaciale</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Snowbed, hummocky terrain on lower backslope
SWT-21	Moist <i>Equisetum arvense</i> , <i>Carex bigelowii</i> , <i>Tomenthypnum nitens</i> , <i>Dryas integrifolia</i> horsetail, sedge tundra	Hummocky terrain with a few small water pits on toeslope
SWT-22	Moist <i>Eriophorum vaginatum</i> , <i>Dryas integrifolia</i> , <i>Salix reticulata</i> , <i>Tomenthypnum nitens</i> tussock-sedge, dwarfshrub tundra	Hummocky terrain, including turf hummocks on lower backslope
SWT-23	Moist <i>Carex bigelowii</i> , <i>Dryas integrifolia</i> , <i>Salix reticulata</i> , <i>Tomenthypnum nitens</i> sedge, dwarf-shrub tundra	Hummocky terrain with solifluction features on sideslope
SWT-24	Moist <i>Equisetum arvense</i> , <i>Carex bigelowii</i> , <i>Dryas integrifolia</i> , <i>Tomenthypnum nitens</i> horsetail, sedge, dwarf-shrub tundra	Solifluction features on lower part of backslope
SWT-25	Moist <i>Eriophorum vaginatum</i> , <i>Salix planifolia ssp.pulchra</i> , <i>Betula nana</i> , <i>Sphagnum rubellum</i> tussocksedge, dwarf-shrub tundra	Hummocky terrain, including turf hummocks on footslope
SWT-26	Moist <i>Eriophorum vaginatum</i> , <i>Betula nana</i> , <i>Sphagnum</i> sp. tussock-sedge, dwarf-shrub tundra	Hummocky terrain, including turf hummocks on midslope
SWT-27	Wet <i>Eriophorum angustifolium</i> , <i>Sphagnum</i> sp., <i>Salix planifolia ssp.pulchra</i> sedge, low-shrub tundra	Well defined hill slope water track with hummocks on midslope
SWT-28	Moist <i>Salix lanata</i> , <i>Carex aquatilis</i> , <i>Valeriana capitata</i> , <i>Drepanocladus uncinatus</i> low shrubland	Active floodplain of small stream
SWT-29	Wet <i>Carex aquatilis</i> , <i>Eriophorum angustifolium</i> , <i>Drepanocladus</i> sp. sedge tundra	Featureless drained lake margin
SWT-30	Aquatic <i>Arctophila julva</i> grass marsh	Lake margin in 20 - 30 cm of water
SWT-31	Dry <i>Calamagrostis purpurascens</i> , <i>Poa glauca</i> , <i>Anemone drummondii</i> grass, forb tundra	Ground squirrel den on kame crest
SWT-32	Moist <i>Eriophorum vaginatum</i> , <i>Betula nana</i> , <i>Sphagnum rubellum</i> tussock-sedge, dwarf-shrub tundra	Inter-frost scar element on sideslope with hummocky terrain
SWT-33	Moist <i>Salix lanata</i> , <i>Carex membranacea</i> , <i>Potentilla fruticosa</i> , <i>Dodecatheon jrigida</i> low-shrub, sedge, forb tundra	Active floodplain of small stream
SWT-34	Moist <i>Carex podocarpa</i> , <i>Salix reticulata</i> , <i>Aconitum delphinifolium</i> sedge, forb tundra	Lake margin at footslope of hill with solifluction features
SWT-35	Dry <i>Luzula arctica</i> , <i>Juncus biglumis</i> barren	Frost scar element in tussock tundra
SWT-36	Moist <i>Betula nana</i> , <i>Rubus chamaemorus</i> , <i>Sphagnum</i> sp. low-shrub tundra.	Sloped margin of small water track
SWT-37	Wet <i>Carex chordorrhiza</i> , <i>Scorpidium scorpioides</i> , <i>Carex aquatilis</i> sedge tundra	Fen along small lake margin, wet element
SWT-38	Moist <i>Carex aquatilis</i> , <i>Dryas integrifolia</i> , <i>Tomenthypnum nitens</i> sedge, dwarf-shrub tundra	Fen along small lake margin, hummock element
SWT-39	Moist <i>Carex bigelowii</i> , <i>Dryas integrifolia</i> , <i>Salix reticulata</i> , <i>Tomenthypnum nitens</i> sedge, dwarf-shrub tundra	Lower backslope, with numerous non sorted stripes, inter-stripe element

SWT-40	Dry <i>Vaccinium uliginosum</i> , <i>Salix reticulata</i> , <i>Equisetum arvense</i> , <i>Astragalus umbellatus</i> , <i>Cetraria cucullata</i> dwarf-shrub, horsetail, fruticose-lichen tundra	Midslope, non sorted stone stripe element with frost scars
SWT-41	Moist <i>Carex bigelowii</i> , <i>Salix reticulata</i> , <i>Tomenthypnum nitens</i> , <i>Equisetum arvense</i> sedge, horsetail, dwarf-shrub tundra	Midslope, nonsorted stripe complex, inter-stripe element
SWT-42	Moist <i>Eriophorum vaginatum</i> , <i>Carex bigelowii</i> , <i>Salix reticulata</i> , <i>Tomenthypnum nitens</i> tussock-sedge, dwarfshrub tundra	Footslope with solifluction features
SWT-43	Moist <i>Carex bigelowii</i> , <i>Equisetum arvense</i> , <i>Dryas integrifolia</i> sedge, horsetail, dwarf-shrub tundra	Hummocky midslope, with turf hummocks
SWT-44	Dry <i>Dryas integrifolia</i> , <i>Cassiope tetragona</i> , <i>Oxytropis maydelliana</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Stripe element of sorted stone-stripe complex
SWT-45	Moist <i>Equisetum arvense</i> , <i>Carex bigelowii</i> , <i>Salix reticulata</i> , <i>Dryas integrifolia</i> , <i>Tomenthypnum nitens</i> horsetail, sedge, dwarf-shrub tundra	Interstripe element of sorted stone-stripe complex
SWT-46	Dry <i>Vaccinium uliginosum</i> , <i>Dryas octopetala</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Featureless hillcrest of glacial moraine
SWT-47	Dry <i>Dryas octopetala</i> , <i>Arnica alpina</i> , <i>Hierochloë alpina</i> , <i>Calamagrostis purpurascens</i> , <i>Oxytropis</i> sp. dwarfshrub, crustose-lichen tundra	Irregular hill crest relief on glacial moraine
SWT-48	Moist <i>Poa glauca</i> , <i>Bromus pumpellianus</i> , <i>Ranunculus pedatifidus</i> grass, forb tundra	Ground squirrel den on hill crest
SWT-49	Dry <i>Cassiope tetragona</i> , <i>Carex micro chaeta</i> , <i>Cladonia arbuscula</i> dwarf-shrub, fruticose-lichen tundra	Snowbed, upper backslope, hummocky terrain with some solifluction features
SWT-50	Moist <i>Cassiope tetragona</i> , <i>Boykinia richardsonii</i> , <i>Hylocomium splendens</i> dwarf-shrub, forb, moss tundra	Snowbed, lower backslope, with solifluction features
SWT-51	Moist <i>Salix rotundifolia</i> , <i>Hylocomium splendens</i> dwarfshrub, moss tundra	Snowbed, lower backslope, with solifluction features
SWT-52	Moist <i>Salix reticulata</i> , <i>Carex bigelowii</i> , <i>Equisetum arvense</i> dwarf-shrub, horsetail sedge tundra	Snowbed, footslope, with large solifluction features
SWT-53	Moist <i>Carex bigelowii</i> , <i>Dryas integrifolia</i> , <i>Hylocomium splendens</i> , <i>Salix planifolia</i> ssp. <i>pulchra</i> sedge, dwarf shrub tundra	Hummocky area with solifluction features on toeslope
SWT-54	Moist <i>Eriophorum vaginatum</i> , <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Hylocomium splendens</i> , <i>Sphagnum rubellum</i> tussock-sedge, dwarf-shrub tundra	Hummocky terrain, including turf hummocks and some solifluction features on lower footslope
SWT-55	Wet <i>Carex aquatilis</i> , <i>Carex chorrndorhiza</i> , <i>Carex rariflora</i> sedge tundra	Strangmoor and aligned hummocks in fen, in colluvial basin
SWT-56	Moist <i>Carex bigelowii</i> , <i>Eriophorum triste</i> , <i>Dryas integrifolia</i> , <i>Cetraria cucullata</i> sedge, dwarf-shrub tundra	Featureless, flat centered polygon on stabilized floodplain
SWT-57	Wet <i>Carex chorrndorhiza</i> , <i>Carex rotundifolia</i> , <i>Carex aquatiUs</i> , <i>Scorpidium scorpioides</i> sedge tundra	Strangmoor and aligned hummocks in fen, in small colluvial basin
SWT-58	Moist <i>Carex aquatilis</i> , <i>Carex rariflora</i> , <i>Salix fuscescens</i> sedge, dwarf-shrub tundra	Strangmoor and aligned hummocks in fen, in small colluvial basin
SWT-59	Dry <i>Salix glauca</i> , <i>Potentilla fruticosa</i> low-shrub tundra	Rocky sideslope of kame

SWT-60	Dry <i>Dryas octopetala</i> , <i>Artemisia arctica</i> , <i>Kobresia myosuroides</i> , <i>Arnica alpina</i> dwarf-shrub, forb tundra	Rocky sideslope of kame
SWT-61	Moist <i>Salix glauca</i> , <i>Betula nana</i> , <i>Festuca altaica</i> low-shrub tundra	Featureless midslope of steep south-facing slope
SWT-62	Moist <i>Carex membranacea</i> , <i>Dodecatheon frigida</i> , <i>Salix reticulata</i> sedge, forb, dwarf-shrub tundra	Featureless lake margin
SWT-63	Dry <i>Salix phlebophylla</i> , <i>Vaccinium vitis-idaea</i> , <i>Cetraria cucullata</i> dwarf-shrub, fruticose-lichen tundra	Featureless glacial outwash terrace
SWT-64	Dry <i>Juncus biglumis</i> , <i>Luzula arctica</i> barren	Backslope, frost scar
SWT-65	Dry <i>Vaccinium vitis-idaea</i> , <i>Hierochloë alpina</i> , <i>Cladonia arbuscula</i> dwarf-shrub, fruticose-lichen tundra	Featureless glaciofluvial outwash terrace
SWT-66	Dry <i>Betula nana</i> , <i>Hierochloë alpina</i> , <i>Cladonia arbuscula</i> low-shrub, fruticose-lichen tundra	Featureless glaciofluvial outwash terrace
SWT-67	Moist <i>Salix lanata</i> , <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Calamagrostis canadensis</i> , <i>Rubus arcticus</i> low shrubland	Featureless glaciofluvial outwash terrace
SWT-68	Moist <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Salix lanata</i> , <i>Calamagrostis canadensis</i> , <i>Potentilla fruticosa</i> , <i>Rubus arcticus</i> low shrub land	Irregular relief on stabilized floodplain
SWT-69	Dry <i>Vaccinium vitis-idaea</i> , <i>Vaccinium uliginosum</i> , <i>Calamagrostis inexpansa</i> , <i>Stereocaulon tomentosum</i> dwarf-shrub, fruticose-lichen tundra	Rocky glaciofluvial outwash terrace
SWT-70	Dry <i>Betula nana</i> , <i>Hierochloë alpina</i> , <i>Cladonia arbuscula</i> low-shrub, fruticose-lichen tundra	Featureless glaciofluvial outwash terrace
SWT-71	Dry <i>Aretous alpina</i> , <i>Hierochloë alpina</i> dwarf-shrub, fruticose-lichen tundra	Featureless glaciofluvial outwash terrace
SWT-72	Wet <i>Carex aquarilis</i> , <i>Eriophorum angustifolium</i> sedge tundra	Featureless lake margin
SWT-73	Moist <i>Eriophorum vaginatum</i> , <i>Betula nana</i> , <i>Hylocomium splendens</i> tussock-sedge, dwarf-shrub tundra	Inter frost-scar element, midslope with tussock tundra
SWT-74	Dry <i>Luzula arctica</i> , <i>Juncus biglumis</i> gray liverwort barren	Frost scar element midslope
SWT-75	Moist <i>Betula nana</i> , <i>Rubus chamaemorus</i> , <i>Hylocomium splendens</i> low-shrub tundra	Featureless water track margin on sideslope
SWT-76	Squirrel dens on kame	Featureless crest of kame
SWT-77	Moist <i>Carex bigelowii</i> , <i>Salix lanata</i> , <i>Betula nana</i> , <i>Hylocomium splendens</i> sedge, low-shrub tundra	Solifluction features on footslope, with merging into colluvial basin
SWT-78	Wet <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Rubus chamaemorus</i> , <i>Sphagnum</i> sp. low shrubland	Well-developed hillslope water track with hummocks
SWT-79	Moist <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Rubus chamaemorus</i> , <i>Sphagnum rubellum</i> , <i>Sphagnum</i> spp. low shrubland	Well-developed hillslope water track
SWT-80	Dry <i>Juncus biglumis</i> , <i>Luzula arctica</i> barren	Frost scar in tussock tundra
SWT-81	Moist <i>Salix planifolia</i> ssp. <i>pulchra</i> , <i>Carex bigelowii</i> , <i>Ledum palustre</i> ssp. <i>decumbens</i> , <i>Hylocomium splendens</i> , <i>Sphagnum rubellum</i> dwarf-shrub, sedge tundra	Solifluction features and hummocks, hill toeslope

Table 3. Legend for the environmental variables.**Landforms**

- 1 Glaciofluvial and other fluvial terraces
- 2 Floodplains
- 3 Talus slope
- 4 Colluvial basin
- 5 Drained lakes and flat lake margins
- 6 Lake or pond
- 7 Hills (including kames and moraines)
- 8 Disturbed

Surficial Geology

- 1 Glacial till
- 2 Glaciofluvial deposit
- 3 Active alluvium
- 4 Stabilized alluvium
- 5 Stream
- 6 Undifferentiated hill slope colluvium
- 7 Basin colluvium and organic deposits
- 8 Drained lake or lacustrine deposits
- 9 Lake or pond
- 10 Roads and gravel pads

Glacial Geology

- 1 Itkillik I till
- 2 Itkillik II till
- 3 Itkillik I outwash
- 4 Itkillik II outwash
- 5 Bedrock

Surficial Geomorphology

- 1 Frost scars
- 2 Wetland hummocks
- 3 Turf hummocks
- 4 Gelifluction features
- 5 Strangmoor or aligned hummocks
- 6 High centered polygons or flat centered polygons
- 7 Sorted and non-sorted stripes
- 8 Palsas
- 9 Thermokarst pits
- 10 Featureless or with < 20% frost scars
- 11 Well-developed hillslope water tracks and small streams > 50 cm deep
- 12 Poorly developed hillslope water tracks, < 50 cm deep
- 13 Gently rolling or irregular microrelief
- 14 Stoney surface
- 15 Lakes and ponds
- 16 Disturbed
- 17 Blockfield

Microsites

- 1 Frost-scar element
- 2 Inter-frost scar element
- 3 Strang or hummock
- 4 Flark or interstrang area
- 5 Polygon center
- 6 Polygon trough
- 7 Stripe element
- 8 Inter-stripe element
- 9 Animal den
- 10 Blockfield

Topographic Position

- 1 Hill crest or shoulder
- 2 Side slope
- 3 Footslope or toeslope
- 4 Flat
- 5 Drainage channel
- 6 Depression
- 7 Lake or pond

Estimated snow duration

- 1.0 Snow free all year
- 2.0 Snow free most of winter; some snow cover persists after storm 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

Exposure Scale

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

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 to 150 cm deep; lakes, streams

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

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 Units

- 1 Pergelic Cryorthent, acid
- 2 Pergelic Cryohemist, euic
- 3 Pergelic Cryosaprist, euic
- 4 Lithic Pergelic Cryosaprist
- 5 Pergelic Cryofibrist, euic
- 6 Histic Pergelic Cryaquept, acid
- 7 Histic Pergelic Cryaquept, nonacid
- 8 Pergelic Cryaquept, acid
- 9 Pergelic Cryaquept, nonacid
- 10 Pergelic Cryochrept
- 11 Pergelic Cryumbrept
- 12 Ruptic-Lithic Cryumbrept
- 13 Pergelic Cryaquoll
- 14 Histic Pergelic Cryaquoll
- 15 Pergelic Cryoboroll

Soil Moisture (modified 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

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Date Sampled	Landform	Surficial Geology	Glacial Geology	Surficial Geomorphology	Microsite	Topographic Position	Slope(°)	Aspect(°)	Exposure (Scalar)	Site Moisture (Scalar)
SWT-1	8/1/89	2	4	4	1		5	2	0	1.5	7.0
SWT-2	8/1/89	2	4	4	10		5	2	0	1.2	6.0
SWT-3	8/2/89	1	6	4	3		3	5	0	1.5	5.0
SWT-4	8/2/89	6	9	4	15		7	0	-	3.5	9.0
SWT-5	8/2/89	1	2	4	6	5	4	2	0	3	3.5
SWT-6	8/2/89	1	2	4	6	5	4	1	0	3	3.5
SWT-7	8/3/89	1	2	4	10		1	2	0	3.5	3.5
SWT-8	8/3/89	1	2	4	3		2	30	270	1.8	4.0
SWT-9	8/3/89	1	6	4	3		3	10	290	1.2	5.0
SWT-10	8/3/89	1	6	4	7		3	3	270	2	6.0
SWT-11	8/3/89	4	7	4	5	4	4	0	-	2	8.5
SWT-12	8/4/89	4	7	4	5	4	4	0	-	2	8.5
SWT-13	8/4/89	4	7	4	10		4	0	-	2	8.5
SWT-14	8/4/89	4	7	4	5	3	4	0	-	2	7.0
SWT-15	8/4/89	4	7	4	5	4	4	0	-	2	8.5
SWT-16	8/4/89	5	8	4	3		4	3	0	4	6.0
SWT-17	8/4/89	7	1	1	13		1	0	-	4	5.5
SWT-18	8/4/89	7	1	1	10		1	0	-	4	3.0
SWT-19	8/5/89	7	6	1	10		2	35	90	2.5	4.0
SWT-20	8/5/89	7	6	1	3		3	15	90	2.5	4.0
SWT-21	8/5/89	7	6	1	3		2	5	90	2	6.5
SWT-22	8/5/89	7	6	1	3		2	5	90	2	6.5
SWT-23	8/5/89	7	6	1	3		2	10	90	2	6.5
SWT-24	8/5/89	7	6	1	4		2	10	90	1.8	6.5
SWT-25	8/6/89	7	6	4	3	2	3	3	45	2	6.0
SWT-26	8/6/89	7	6	1	10	2	2	4	10	2	5.5
SWT-27	8/6/89	3	4	1	10		5	30	0	1.8	9.0
SWT-28	8/8/89	2	4	4	13		5	2	90	2	6.5
SWT-29	8/16/89	5	8	4	10		4	0	-	2	8.0
SWT-30	8/16/89	6	9	4	10		7		-	2	9.0

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Date Sampled	Landform	Surficial Geology	Glacial Geology	Surficial Geomorphology	Microsite	Topographic Position	Slope(°)	Aspect(°)	Exposure (Scalar)	Site Moisture (Scalar)
SWT-31	8/23/89	7	2	4	16		1		-	3	3.0
SWT-32	8/13/89	7	6	1	1	2	2	4		2	7.0
SWT-33	8/8/89	2	4	4	13		5	3	9	1.8	6.0
SWT-34	8/8/89	5	8	4	13		4		-	2	6.0
SWT-35	8/13/89	7	6	1	1	1	2	2		2	5.0
SWT-36	8/22/89	7	6	1	3		2	5	45	1.5	6.5
SWT-37	8/8/89	4	7	2	5	4	4		-	2	8.5
SWT-38	8/8/89	4	7	2	5	3	4		-	2	5.5
SWT-39	8/8/89	7	6	2	4	2	2	6	16	2.5	6.0
SWT-4	8/9/89	7	6	2	7	7	2	6	15	2.5	5.0
SWT-41	8/9/89	7	6	2	7	8	2	6	15	2.5	5.5
SWT-42	8/8/89	7	6	2	4		3	5	16	2.5	5.0
SWT-43	8/9/89	7	6	2	3		2	5	15	2	5.5
SWT-44	8/9/89	7	6	2	7	7	2	7	1	2.8	5.0
SWT-45	8/8/89	7	6	2	7	8	2	7	1	2.8	5.0
SWT-46	8/9/89	7	6	2	1	2	1		-	4	3.5
SWT-47	8/1/89	7	1	2	1		1		-	4	3.0
SWT-48	8/9/89	7	1	2	13		1		-	4	4.0
SWT-49	8/1/89	7	6	2	3		2	3		1	4.0
SWT-5	8/1/89	7	6	2	4		2	25		1.5	5.0
SWT-51	8/1/89	7	6	2	4		3	1		2	5.5
SWT-52	8/1/89	7	6	2	4		3	15		2.5	6.0
SWT-53	8/1/89	7	6	2	4		3	5	33	2.5	6.0
SWT-54	8/1/89	7	6	2	1		3	3	3	3	6.0
SWT-55	8/11/89	4	7	2	5	3	4		-	3	8.8
SWT-56	8/11/89	2	4	2	6	5	4	1	27	2	7.0
SWT-57	8/11/89	4	7	2	5	4	5		-	2	8.5
SWT-58	8/11/89	4	7	2	5	3	4		-	2	7.0
SWT-59	8/11/89	7	1	2	14		2	2	18	3.5	4.5
SWT-6	8/11/89	7	1	2	14		2	15	2	3.5	4.0
SWT-61	8/14/89	7	1	2	1		2	2	18	3	6.0
SWT-62	8/14/89	5	1	2	1		4		-	2.5	7.0

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Date Sampled	Landform	Surficial Geology	Glacial Geology	Surficial Geomorphology	Microsite	Topographic Position	Slope(°)	Aspect(°)	Exposure (Scalar)	Site Moisture (Scalar)
SWT-63	8/14/89	1	2	4	1		4		-	3	4.0
SWT-64	8/21/89	7	6	1	1	1	2		-	2	5.0
SWT-65	8/12/89	1	2	4	1		4		-	3.5	4.0
SWT-66	8/12/89	1	2	4	1		4		-	3	4.0
SWT-67	8/14/89	5	2	4	1		6		-	2.5	6.0
SWT-68	8/12/89	2	4	4	13		5	1	18	2	6.5
SWT-69	8/12/89	1	2	4	14		4	2	27	2	4.0
SWT-7	8/12/89	1	2	4	1		3	3	27	2	4.5
SWT-71	8/12/89	1	2	4	1		4		-	3.5	4.0
SWT-72	8/2/89	5	8	4	1		4		-	2	8.0
SWT-73		7	6	1	1		2	3		2	7.0
SWT-74	8/22/89	7	6	1	1	1	2		-	1.8	5.0
SWT-75	8/21/89	2	4	1	11		2	2		1.8	7.0
SWT-76	8/24/89	7	2	4	13		1		-	3	3.0
SWT-77	8/5/89	7	6	4	4		3	2	9	1.5	7.0
SWT-78	8/22/89	2	4	1	11		5	3	35	1.8	8.5
SWT-79	8/22/89	2	4	1	11		5	3	15	1.8	7.2
SWT-8	8/13/89	7	6	1	1	1	2		-	2	5.0
SWT-81	8/23/89	7	6	2	4		2	2	36	2	6.5

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Snow Duration (Scalar)	Stability (Scalar)	Cryo- turbation (%)	Height of Microrelief (cm)	Thaw Depth (cm)	Water Cover (%)	Bare soil Cover (%)	Rock Cover (%)	Soil Units	Soil Moisture
SWT-1	5.0	4.0	0	5	R	0	0	0	9	7
SWT-2	5.0	4.0	0	5	>46	0	0	0	15	4
SWT-3	5.0	1.5	0	10	>60	0	0	0	11	4
SWT-4	4.0	4.0	0	15	R	100	0	0	5	10
SWT-5	3.0	1.0	0	5	R	0	0	5	10	3
SWT-6	3.0	1.0	20	10	R	0	0	0	8	3
SWT-7	2.0	1.0	0	5	>100	0	0	0	10	3
SWT-8	4.0	3.5	10	20	-	0	0	0	10	3
SWT-9	5.0	3.0	0	50	>100	0	0	0	13	3
SWT-10	4.5	3.0	0	15	>80	0	0	0	9	7
SWT-11	4.0	1.0	0	5	43	0	0	0	2	9
SWT-12	4.0	1.0	0	5	50	100	0	0	5	9
SWT-13	4.0	1.0	0	5	61	100	0	0	2	9
SWT-14	4.0	1.0	0	5	56	0	0	0	2	8
SWT-15	4.0	1.0	0	5	50	100	0	0	5	8.5
SWT-16	5.7	3.0	0	20	>40	0	0	0	13	6
SWT-17	2.0	5.0	0	20	R	0	0	0	11	2
SWT-18	2.0	1.0	10	8	>77	0	10	30	10	2
SWT-19	4.0	1.5	0	15	>80	0	0	1	10	3
SWT-20	5.5	2.0	2	40	>50	0	0	1	10	3
SWT-21	5.0	3.0	0	20	95	0	0	0	7	6
SWT-22	5.0	3.0	5	15	40	0	0	0	7	6.5
SWT-23	5.0	3.0	0	30	44	0	0	0	7	7
SWT-24	5.0	3.0	0	50	47	0	0	0	9	6.5
SWT-25	4.0	1.0	5	20	36	0	0	0	8	6
SWT-26	4.0	1.0	5	15	46	0	0	0	8	6
SWT-27	5.0	4.0	0	20	58	50	0	0	6	9
SWT-28	5.0	4.0	0	30	>53	5	0	0	3	7
SWT-29	4.0	1.0	0	5	R	10	0	0	7	8.5
SWT-30	4.0	1.0	0	-	57	100	25	0	5	10
SWT-31	2.5	5.0	0	20	>100	0	20	0	10	3
SWT-32	4.0	1.0	15	15	40	0	0	0	6	7

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Snow Duration (Scalar)	Stability (Scalar)	Cryo- turbation (%)	Height of Microrelief (cm)	Thaw Depth (cm)	Water Cover (%)	Bare soil Cover (%)	Rock Cover (%)	Soil Units	Soil Moisture
SWT-33	4.5	4.0	0	30	>57	5	0	0	3	6.5
SWT-34	4.0	3.0	0	50	>63	0	0	0	3	6
SWT-35	4.0	5.0	100	5	75	0	75	0	8	5
SWT-36	4.5	3.0	0	25	34	0	0	0	6	3
SWT-37	4.0	3.0	0	15	>100	80	0	0	2	9
SWT-38	4.0	1.5	0	15	78	0	0	0	7	6.5
SWT-39	3.5	3.0	20	10	65	0	10	0	9	7
SWT-40	3.0	3.0	20	15	>100	0	15	0	9	5
SWT-41	3.0	3.0	5	20	56	0	0	0	3	6.5
SWT-42	3.5	3.0	5	30	47	0	0	0	7	6
SWT-43	4.0	3.0	0	15	76	0	0	0	7	6.5
SWT-44	3.0	3.0	20	5	>100	0	15	0	9	5.5
SWT-45	3.0	3.0	0	10	80	0	0	0	7	6.5
SWT-46	2.0	3.0	10	10	>80	0	10	0	8	4
SWT-47	2.0	1.0	3	15	>65	0	10	50	11	2
SWT-48	2.0	5.0	0	30	R	0	0	0	15	2
SWT-49	6.0	3.0	0	10	>50	0	0	0	15	3
SWT-50	5.5	4.0	0	20	90	0	0	0	15	4
SWT-51	6.0	3.0	0	30	53	0	0	0	7	6.5
SWT-52	6.0	3.0	0	70	53	0	0	0	14	7
SWT-53	4.5	3.0	0	20	40	0	0	0	14	7
SWT-54	4.0	3.0	5	30	44	0	0	0	7	7
SWT-55	4.0	3.0	0	30	-	10	5	0	3	9
SWT-56	4.0	2.0	0	10	38	0	0	0	3	7
SWT-57	4.0	3.0	0	15	56	80	0	0	7	9
SWT-58	4.0	3.0	0	10	70	0	0	0	7	7
SWT-59	4.5	5.0	0	50	R	0	0	0	15	4.5
SWT-60	2.0	1.0	10	40	R	0	0	30	10	4
SWT-61	4.5	3.0	0	25	R	0	0	0	15	6
SWT-62	4.0	1.0	0	10	R	0	0	0	4	7
SWT-63	3.5	1.0	0	20	R	0	0	0	10	4
SWT-64	4.0	5.0	100	3	64	0	50	0	8	5

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 4. Environmental data for permanent plots, abiotic data

Plot No.	Snow Duration (Scalar)	Stability (Scalar)	Cryo- turbation (%)	Height of Microrelief (cm)	Thaw Depth (cm)	Water Cover (%)	Bare soil Cover (%)	Rock Cover (%)	Soil Units	Soil Moisture
SWT-65	2.5	1.0	0	5	R	0	0	5	10	3
SWT-66	3.0	1.0	0	10	R	0	0	0	10	3
SWT-67	4.5	1.0	0	10	R	0	0	0	15	6
SWT-68	3.5	4.0	0	60	R	0	0	5	4	6
SWT-69	4.5	1.0	0	10	R	0	0	0	10	6.5
SWT-70	4.5	1.0	0	10	>30	0	0	0	10	2
SWT-71	2.5	1.0	0	3	>46	0	0	5	10	2
SWT-72	4.0	1.0	0	5	R	0	0	0	5	9
SWT-73	4.0	1.0	5	30	46	0	0	0	8	7
SWT-74	4.0	5.0	100	5	56	0	30	0	8	5
SWT-75	4.5	1.0	0	15	33	0	0	0	7	6
SWT-76	2.0	5.0	0	10	>100	0	30	0	11	3
SWT-77	4.0	3.0	0	60	32	0	0	0	3	5
SWT-78	4.5	4.0	0	20	79	20	10	0	6	9
SWT-79	5.0	1.5	0	10	57	0	0	0	7	7
SWT-80	4.0	5.0	100	5	68	0	0	0	8	5
SWT-81	4.0	3.0	0	30	40	0	0	0	3	6

Table 4. Environmental data for permanent plots, biotic data

Plot No.	Date Sampled	Tall shrub Cover (%)	Low shrub Cover (%)	Dwarf shrub Cover (%)	Shrub height (cm)	Graminoid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryophyte Cover (%)	Horsetail Cover (%)
SWT-1	8/1/89	0	5	50	25	60	5	+	20	0
SWT-2	8/1/89	10	60	5	200	10	25	0	+	0
SWT-3	8/2/89	0	5	60	10	2	5	70	60	0
SWT-4	8/2/89	0	0	0	0	30	1	0	20	0
SWT-5	8/2/89	0	0	70	2	1	r	10	30	0
SWT-6	8/2/89	0	15	50	25	7	+	30	40	0
SWT-7	8/3/89	0	0	40	2	+	1	30	1	0
SWT-8	8/3/89	0	-	60	3	+	+	50	2	0
SWT-9	8/3/89	0	10	60	10	+	5	40	75	0
SWT-10	8/3/89	0	0	30	10	25	+	5	85	20
SWT-11	8/3/89	0	0	0	0	35	+	0	+	0
SWT-12	8/4/89	0	0	0	0	25	0	0	+	0
SWT-13	8/4/89	0	0	0	0	50	+	0	+	0
SWT-14	8/4/89	0	0	1	2	75	+	+	30	0
SWT-15	8/4/89	0	0	0	0	30	+	0	+	0
SWT-16	8/4/89	0	0	40	2	40	10	+	60	0
SWT-17	8/4/89	0	0	5	2	30	60	0	10	0
SWT-18	8/4/89	0	0	40	2	+	+	40	+	0
SWT-19	8/5/89	0	5	60	5	+	+	30	5	0
SWT-20	8/5/89	0	1	70	10	1	20	20	20	0
SWT-21	8/5/89	0	-	30	5	25	1	3	50	30
SWT-22	8/5/89	0	0	60	5	40	1	5	40	0
SWT-23	8/5/89	0	0	40	3	50	+	1	40	0
SWT-24	8/5/89	0	0	35	3	35	2	1	60	20
SWT-25	8/6/89	0	0	40	10	40	+	1	40	0
SWT-26	8/6/89	0	0	50	30	40	+	1	40	0
SWT-27	8/6/89	0	0	10	50	50	+	r	40	0
SWT-28	8/8/89	0	75	10	100	40	15	0	50	0
SWT-29	8/16/89	0	0	0	0	70	1	0	30	0
SWT-30	8/16/89	0	0	0	0	30	20	0	30	0

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 4. Environmental data for permanent plots, biotic data

Plot No.	Date Sampled	Tall shrub Cover (%)	Low shrub Cover (%)	Dwarf shrub Cover (%)	Shrub height (cm)	Graminoid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryophyte Cover (%)	Horsetail Cover (%)
SWT-31	8/23/89	0	0	2	50	75	5	+	30	0
SWT-32	8/13/89	0	0	60	20	50	+	3	50	0
SWT-33	8/8/89	0	40	20	90	20	20	0	20	0
SWT-34	8/8/89	0	0	35	30	40	5	+	40	0
SWT-35	8/13/89	0	0	5	0	2	0	1	30	0
SWT-36	8/22/89	0	40	50	70	+	+	+	70	0
SWT-37	8/8/89	0	0	0	0	35	+	0	15	0
SWT-38	8/8/89	0	0	25	2	40	+	+	80	0
SWT-39	8/8/89	0	0	40	5	35	+	+	70	0
SWT-40	8/9/89	0	0	25	8	10	10	30	20	15
SWT-41	8/9/89	0	0	25	7	30	2	2	60	20
SWT-42	8/8/89	0	0	30	15	20	1	+	70	0
SWT-43	8/9/89	0	0	30	5	20	1	5	60	20
SWT-44	8/9/89	0	0	50	8	10	5	50	40	10
SWT-45	8/8/89	0	0	35	5	20	5	1	80	30
SWT-46	8/9/89	0	0	40	3	1	10	40	25	0
SWT-47	8/10/89	0	0	60	2	+	1	20	+	0
SWT-48	8/9/89	0	10	10	50	60	20	+	30	0
SWT-49	8/10/89	0	0	70	10	1	1	60	40	0
SWT-50	8/10/89	0	0	60	5	+	15	+	70	0
SWT-51	8/10/89	0	0	70	3	1	5	+	80	+
SWT-52	8/10/89	0	0	50?	5	20	5	+	80	20
SWT-53	8/10/89	0	0	40	35	35	1	2	65	0
SWT-54	8/10/89	0	0	30	15	5	+	1	50	0
SWT-55	8/11/89	0	0	+	5	35	1	0	15	0
SWT-56	8/11/89	0	0	25	5	25	+	30	40	0
SWT-57	8/11/89	0	0	+	0	25	+	0	10	0
SWT-58	8/11/89	0	0	15	5	40	+	+	40	0
SWT-59	8/11/89	0	80	20	100	2	2	1	5	0
SWT-60	8/11/89	0	0	50	2	5	10	20	1	0
SWT-61	8/14/89	0	80	20	100	+	+	30	80	0
SWT-62	8/14/89	0	0	60	10	30	10	0	50	0

Table 4. Environmental data for permanent plots, biotic data

Plot No.	Date Sampled	Tall shrub Cover (%)	Low shrub Cover (%)	Dwarf shrub Cover (%)	Shrub height (cm)	Graminoid Cover (%)	Forb Cover (%)	Lichen Cover (%)	Bryophyte Cover (%)	Horsetail Cover (%)
SWT-63	8/14/89	0	0	80	5	+	+	40	1	0
SWT-64	8/21/89	0	0	12	0	1	0	50	30	0
SWT-65	8/12/89	0	0	50	5	5	+	50	15	0
SWT-66	8/12/89	0	70	25	50	+	+	15	50	0
SWT-67	8/14/89	0	85	5	150	5	5	+	15	0
SWT-68	8/12/89	0	80	30	200	10	5	0	20	0
SWT-69	8/12/89	0	0	60	5	+	r	50	+	0
SWT-70	8/12/89	0	75	30	30	+	+	25	40	0
SWT-71	8/12/89	0	0	80	5	5	0	30	5	0
SWT-72	8/2/89	0	0	+	0	60	1	0	80	0
SWT-73		0	0	70	20	50	+	+	70	0
SWT-74	8/22/89	0	0	10	0	3	0	20	60	0
SWT-75	8/21/89	0	80	50	60	+	+	+	90	0
SWT-76	8/24/89	0	0	10	2	40	15	+	20	0
SWT-77	8/5/89	0	7	35	35	40	1	+	70	0
SWT-78	8/22/89	0	70	35	80	25	+	0	70	0
SWT-79	8/22/89	0	60	40	45	+	+	0	100	0
SWT-80	8/13/89	0	0	20	2	+	+	10	50	0
SWT-81	8/23/89	0	5	50	30	30	+	1	85	0

Table 4. Environmental data for permanent plots, biotic data

Plot No.	(Scalar):								
	Disturbance Human	Fox	Bear	Caribou	Squirrel	Lemmg/vole	Moose	Bird	Insect
SWT-1	0	0	0	0	0	1	0	0	0
SWT-2	0	0	0	0	0	1	1	0	0
SWT-3	0	0	0	1	0	0	0	0	0
SWT-4	0	0	0	0	0	0	0	0	0
SWT-5	0	0	0	1	0	0	0	0	0
SWT-6	0	0	0	1	0	0	0	0	0
SWT-7	0	0	0	1	0	0	0	1	0
SWT-8	0	0	0	1	0	0	0	0	0
SWT-9	0	0	0	1	2.5	0	0	0	0
SWT-10	0	0	0	1	0	0	0	0	0
SWT-11	0	0	0	0	0	0	0	0	0
SWT-12	0	0	0	0	0	0	0	0	0
SWT-13	0	0	0	0	0	0	0	0	0
SWT-14	0	0	0	1	0	0	0	0	0
SWT-15	0	0	0	0	0	0	0	0	0
SWT-16	3.8	0	0	0	0	0	0	0	0
SWT-17	0	0	0	0	5	0	0	0	0
SWT-18	0	0	0	1	0	0	0	0	0
SWT-19	0	0	0	1	3	0	0	0	0
SWT-20	0	0	0	1	2	0	0	0	0
SWT-21	0	0	0	1	0	0	0	0	0
SWT-22	0	0	0	1	0	0	0	0	0
SWT-23	0	0	0	1	0	0	0	0	0
SWT-24	0	0	0	1	0	0	0	0	0
SWT-25	0	0	0	1	0	0	0	0	0
SWT-26	0	0	0	1	0	0	0	0	0
SWT-27	0	0	0	0	0	0	0	0	0
SWT-28	0	0	0	2	0	0	0	0	0
SWT-29	0	0	0	1	0	0	0	0	0
SWT-30	0	0	0	0	0	0	0	0	0
SWT-31	0	0	0	0	4	0	0	0	0
SWT-32	0	0	0	1	0	3	0	1	0

Table 4. Environmental data for permanent plots, biotic data

Plot No.	(Scalar):								
	Disturbance Human	Fox	Bear	Caribou	Squirrel	Lemmg/vole	Moose	Bird	Insect
SWT-33	0	0	0	4	0	4	0	0	0
SWT-34	0	0	0	4	0	2	0	0	0
SWT-35	0	0	0	0	0	0	0	0	0
SWT-36	0	0	0	1	0	0	0	0	0
SWT-37	0	0	0	0	0	0	0	0	0
SWT-38	0	0	0	1	0	0	0	0	0
SWT-39	0	0	0	1	0	0	0	1	0
SWT-40	0	0	0	1	0	0	0	0	0
SWT-41	0	0	0	1	0	0	0	0	0
SWT-42	0	0	0	1	0	0	0	1	0
SWT-43	0	0	0	1	0	0	0	0	0
SWT-44	0	0	0	1	2	0	0	0	0
SWT-45	0	0	0	1	0	0	0	0	0
SWT-46	0	0	0	2	0	0	0	0	0
SWT-47	0	0	0	1	3	0	0	0	0
SWT-48	0	0	0	0	5	0	0	0	0
SWT-49	0	0	0	1	4	0	0	0	0
SWT-50	0	0	0	1	3	0	0	0	0
SWT-51	0	0	0	1	1	0	0	0	0
SWT-52	0	0	0	1	0	1	0	0	0
SWT-53	0	0	0	1	0	3	0	0	0
SWT-54	0	0	0	1	0	2	0	0	0
SWT-55	0	0	0	0	2	1	0	0	0
SWT-56	0	0	0	1	0	2	0	1	0
SWT-57	0	0	0	1	0	0	0	0	0
SWT-58	0	0	0	1	1	1	0	0	0
SWT-59	0	0	0	1	4	0	0	0	0
SWT-60	0	0	0	1	0	0	0	0	0
SWT-61	0	0	0	0	0	0	0	1	0
SWT-62	4	0	0	1	0	0	0	0	0
SWT-63	0	0	0	1	0	0	0	0	0
SWT-64	0	0	0	0	0	0	0	0	0

Table 4. Environmental data for permanent plots, biotic data

Plot No.	Disturbance	(Scalar):							
	Human	Fox	Bear	Caribou	Squirrel	Lemmg/vole	Moose	Bird	Insect
SWT-65	0	0	0	1	0	0	0	1	0
SWT-66	0	0	0	1	0	0	0	0	0
SWT-67	0	0	0	0	3	1	0	0	0
SWT-68	0	0	0	1	0	1	0	0	0
SWT-69	0	0	0	1	0	0	0	0	0
SWT-70	0	0	0	1	0	0	0	0	0
SWT-71	0	0	0	1	0	0	0	1	0
SWT-72	0	0	0	1	0	0	0	0	0
SWT-73	0	0	0	0	0	0	0	0	0
SWT-74	0	0	0	0	0	0	0	0	0
SWT-75	0	0	0	0	0	0	0	0	0
SWT-76	0	0	0	1	5	0	0	2	0
SWT-77	0	0	0	1	0	0	0	0	0
SWT-78	0	0	0	0	0	0	0	0	0
SWT-79	0	0	0	1	0	0	0	0	0
SWT-80	0	0	0	0	0	0	0	0	0
SWT-81	0	0	0	1	0	1	0	1	0

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
											Field	1/3 atm	15 atm	
T-001	SWT-1	Oa	0 - 10	7.5YR 2/2	0.57		##	##	##	##	114.7	##	##	37.3
T-002	SWT-1	A	10 - 20	10YR 3/2	1.55						21.8			
T-003	SWT-2	A1	0 - 10	7.5YR 2/2.5	1.06	56	94	1	5	S	8.0	##	##	4.7
T-004	SWT-2	A2	10 - 46	10YR 2.5/3	0.81	4	76	13	11	SL	45.2	##	##	6.5
T-005	SWT-3	Oa2	4 - 18	7.5YR 2/2	0.20		##	##	##	##	248.9	##	##	69.6
T-006	SWT-4	Oi			0.15		##	##	##	##	217.5	##	##	23
T-007	SWT-4	C			-						-			
T-008	SWT-5	Oa	0 - 8	7.5YR 2/2	-		****	****	****	****	-	##	##	46.3
T-009	SWT-5	Bw	8 - 12	7.5YR 4.5/4	-	22	54	35	11	SL	-	##	##	6
T-010	SWT-5	Bw2	12 - 39	7.5YR 4.5/6	-	67	70	14	16	SL	-	##	##	3.8
T-011	SWT-5	C	39 - 45+	10YR 3/4	-	54	84	8	8	LS	-	##	##	2.6
T-012	SWT-6	Bg	3 - 30+	7.5YR 2/3	0.60		##	##	##	##	91.5	##	##	51.7
T-013	SWT-7	Oa	0 - 5	7.5YR 2/1.5	0.62		##	##	##	##	43.1	##	##	23.9
T-014	SWT-7	Bkj	5 - 25	10YR 3/3.5	1.22						8.1			
T-015	SWT-7	Ck1	25 - 56	10YR 3.5/2	1.38						4.6			
T-016	SWT-8	Oa	0 - 8	7.5YR 2/2	0.63	4	62	27	11	SL	99.2	##	##	27.3
T-017	SWT-8	Bw	8 - 20	10YR 4.5/6	1.51	63	35	33	32	CL	21.0	##	##	10.5
T-018	SWT-8	IIC	20 - 45+	10YR 4/2	1.74	77	88	4	8	LS	3.8	##	##	0.9
T-019	SWT-9	Oa	4 - 17	7.5YR 2/2	0.35		##	##	##	##	208.3	##	##	50.3

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-020	SWT-9	A/B	17 - 52	10YR 3/3	1.02						15.1			
T-021	SWT-9	C	52 - 67+	10YR 4/3	0.79						14.9			
T-022	SWT-10	Oa	7 - 16	7.5YR 2/1	0.22		##	##	##	##	347.1	##	##	64.2
T-023	SWT-10	Bw	16 - 33	10YR 3/2.5	1.38						25.7			
T-024	SWT-11	Oe	5 - 25	7.5YR 3.5/3	0.15		****	****	****	****	576.8	##	##	70.7
T-025	SWT-11	Oa	25 - 40	7.5YR 3/3	0.47		54	34	12	SL	454.6	##	##	56.1
T-026	SWT-12	Oi	-		0.14						611.6			
T-027	SWT-12	Oe	-		0.27						1020.6			
T-028	SWT-12	Oa	-		0.11		##	##	##	##	744.1	##	##	74.5
T-029	SWT-13	Oi	0 - 15	7.5YR 3/3	0.30		****	****	****	****	239.3	##	##	62.9
T-030	SWT-13	Oe	15 - 30	7.5YR 3/3	0.17		****	****	****	****	416.9	##	##	60.6
T-031	SWT-13	Oa	30 - 40+	7.5YR 3/3	0.18		****	****	****	****	502.6	##	##	63.1
T-032	SWT-14	Oi	0 - 6	7.5YR 2/2.5	0.15		****	****	****	****	472.1	##	##	82.1
T-033	SWT-14	Oe	6 - 30	7.5YR 3/3.5	0.14		****	****	****	****	615.3	##	##	84
T-034	SWT-14	Oa	30 - 40+	10YR 3/3	0.13		****	****	****	****	815.4	##	##	81.1
T-035	SWT-15	Oe	4 - 25		0.32		##	##	##	##	528.4	##	##	78
T-036	SWT-16	A	6 - 32	7.5YR 2/2	1.15		##	##	##	##	38.7	##	##	17.3
T-037	SWT-17	Oa	3 - 14	7.5YR 2/2	0.51						56.1			
T-038	SWT-17	A	14 - 40	7.5YR 3/3.5	0.72		##	##	##	##	23.6	##	##	28.9
T-039	SWT-18	A	0 - 5	10YR 2/3	1.07		##	##	##	##	22.5	##	##	11.4
T-040	SWT-18	Bw1	5 - 24	10YR 4/6	0.93						14.9			
T-041	SWT-19	Oa	3 - 12	5YR 2/2.5	0.23		##	##	##	##	152.1	##	##	60.1

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-042	SWT-19	IIBw1	12 - 20	10YR 4/4	1.14						14.4			
T-043	SWT-19	III Ckj	59 - 87+	10YR 3/2	1						10.4			
T-044	SWT-20	Oa	4 - 18	7.5YR 2/1.5	0.64		##	##	##	##	202.3	##	##	51.7
T-045	SWT-20	IIEj	18 - 36	10YR 3.5/5	1.35						10.1			
T-046	SWT-20	IIIA	36 - 56	10YR 3/2	1.28						12.5			
T-047	SWT-21	Oa	6 - 18	7.5YR 2/1	0.23		##	##	##	##	357.2	##	##	58.4
T-048	SWT-21	Bw	18 - 28	10YR 3.5/3	0.96						21.0			
T-049	SWT-21	Bg	28 - 60	10YR 3.5/1	1.23						17.7			
T-050	SWT-22	Oe	5 - 13	7.5YR 2/1	0.05						536.9			
T-051	SWT-22	Oa	13 - 21	7.5YR 2/2	0.18		##	##	##	##	426.1	##	##	77.6
T-052	SWT-22	Bhs	21 - 28	10YR 4.5/6	0.98						41.2			
T-053	SWT-22	Bg	28 - 40	10YR 4/1	1.37						29.9			
T-054	SWT-23	Oa	11 - 20	7.5YR 2/2	0.24		##	##	##	##	469.8	##	##	77.2
T-055	SWT-23	Bg	20 - 44	10YR 4/1	1.20						40.4			
T-056	SWT-24	Oa	9 - 13	10YR 2.5/2	0.33		##	##	##	##	238.6	##	##	52.3
T-057	SWT-24	Bg	13 - 47	10YR 4/2	1.24						31.1			
T-058	SWT-25	Oa	6 - 11	7.5YR 2.5/3	0.30		##	##	##	##	272.7	##	##	43.7
T-059	SWT-25	Bw	11 - 29	10YR 4/4	0.74						47.3			
T-060	SWT-26	Oa	7 - 10	10YR 2/2	0.12		****	****	****	****	393.0	79.5	53	71.6
T-061	SWT-26	Bw	10 - 40	10YR 3/4	0.60	16	46	26	28	SCL	39.7	28.2	13.7	6.5
T-062	SWT-27	B/O	19 - 40	10YR 15/2.5	0.67	0	45	39	16	L	78.0	##	##	12.8
T-063	SWT-28	Oe	3 - 11	7.5YR 2/1	0.08						468.0			

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-064	SWT-28	Oa1	11 - 42	7.5YR 2/2	0.14		##	##	##	##	485.6	##	##	74.7
T-065	SWT-29	Oi2	9 - 21	7.5YR 2/2	0.21		##	##	##	##	773.5	##	##	64.9
T-066	SWT-29	C	21 - 26	10YR 3.5/2	0.38						168.1			
T-067	SWT-30	A	40+	10YR 3/2	0.57	3	36	40	24	L	190.3	##	##	6.5
T-068	SWT-31	Oa	0 - 3	7.5YR 2/2	0.37						115			
T-069	SWT-31	IIA	3 - 11	10YR 3.5/2	1.02						27.7			
T-070	SWT-31	IIIOb	11 - 16	7.5YR 2/2	0.55		##	##	##	##	35.8	##	##	32.3
T-071	SWT-31	IVC	16+		1.73						2.4			
T-072	SWT-32	Oa	9 - 18	10YR 3/3	0.53		##	##	##	##	192.6	##	##	38
T-073	SWT-32	Bw	18 - 40	10YR 4/3	1.13						42.5			
T-074	SWT-33	Oa1	4 - 12	7.5YR 2/1.5	0.20						378.5			
T-075	SWT-33	Oa2	12 - 56	7.5YR 2/2	0.24		##	##	##	##	308.8	##	##	55.3
T-076	SWT-34	Oe	3 - 15	7.5YR 2/1.5	0.12		****	****	****	****	373.7	##	##	77.9
T-077	SWT-34	Oa	15 - 63	7.5YR 2/1.5	0.21		52	42	6	SL	341.1	##	##	69.5
T-078	SWT-35	Bw1	0 - 6	10YR 4/6	0.98	3	52	28	20	SCL/L	22.4	##	##	2.5
T-079	SWT-36	Oi	0 - 9	10YR 5.5/6	0.04						482.7			
T-080	SWT-36	Oa1	12 - 16	5YR 2/2	0.15						418.0			
T-081	SWT-36	Oa2	16 - 21		0.34		##	##	##	##	198.1	##	##	44.8
T-082	SWT-36	Bw	21 - 35	10YR 4/2	1.53						25.9			
T-083	SWT-37	Oi2	2 - 32	7.5YR 3/2	0.14		****	****	****	****	578.4	##	##	78.5
T-084	SWT-37	Oa	32 - 40+	7.5YR 3.5/1	1.18	52	49	39	12	L	49.9	##	##	21.5
T-085	SWT-38	Oi	0 - 3		0.06		****	****	****	****	469.0	##	##	82.6

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-086	SWT-38	Oa	3 - 8	7.5YR 2/1.5	0.17		****	****	****	****	360.1	##	##	60.8
T-087	SWT-38	IIOe1	8 - 19	7.5YR 2/3	0.13		72	28	0	LS	481.6	##	##	81.3
T-088	SWT-38	Bg	24 - 53	10YR 3.5/1	1.56	15	48	28	24	SCL/L	24.8	##	##	6.3
T-089	SWT-39	Oi	0 - 4		0.06		****	****	****	****	529.5	##	##	86
T-090	SWT-39	Oa	4 - 15	7.5YR 2/1.5	0.19		64	36	0	SL	403.0	##	##	76.2
T-091	SWT-39	Bh	15 - 51	10YR 3/2	1.24	9	44	30	26	L	31.3	##	##	4.5
T-092	SWT-40	Oa	8 - 13	7.5YR 2/1	0.27		72	28	0	LS	224.9	##	##	60.5
T-093	SWT-40	B1	13 - 18	10YR 3/3	1.28	50	55	25	20	SCL/L	34.4	##	##	6.7
T-094	SWT-41	Oa1	3 - 7	7.5YR 2/1.5	0.20		70	30	0	LS/SL	357.8	##	##	79.7
T-095	SWT-41	Oa2	7 - 53+	7.5YR 2/2	0.52		55	38	7	SL	114.3	##	##	32.2
T-096	SWT-42	Oi	0 - 6		0.04		****	****	****	****	448.3	##	##	91
T-097	SWT-42	Oe	6 - 11	7.5YR 2/2	0.12		****	****	****	****	468.8	##	##	79.6
T-098	SWT-42	Oa	11 - 28	7.5YR 2/1	0.25		52	48	0	SL	300.5	##	##	63.5
T-099	SWT-42	Bg	28 - 47	10YR 3.5/1	1.51	15	44	28	28	CL	25.0	##	##	5.4
T-100	SWT-43	Oa1	3 - 14	7.5YR 2/1.5	0.18		64	32	4	SL	397.2	****	****	73.1
T-101	SWT-43	Oa2	14 - 20	10YR 2/2	0.52		44	40	16	L	140.8	86.3	74.5	39.9
T-102	SWT-43	Bw	20 - 40	10YR 3/2	1.56	35	46	26	28	SCL	15.8	18.5	11.3	2.3
T-103	SWT-43	Bg	40 - 50+	10YR 3/1	1.07	22	43	26	31	CL	24.7	24	14.6	5.4
T-104	SWT-44	Oa	2 - 17	7.5YR 2/1.5	0.26	0	56	40	4	SL	245.5	##	##	54.9
T-105	SWT-44	Bw	17 - 53	10YR 3.5/2	1.09	40	58	20	22	SCL	18.1	##	##	3.4
T-106	SWT-45	Oi	0 - 8		0.08		****	****	****	****	449.5	179.9	174.3	83.3

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-107	SWT-45	Oa1	8 - 22	7.5YR 2/1	0.19		56	38	6	SL	392.9	150.2	143.6	72.6
T-108	SWT-45	Oa2	22 - 35	7.5YR 2/2	0.59	6	40	42	18	L	126.7	****	****	41.9
T-109	SWT-45	A/B	35 - 60	10YR 4/3	0.81	29	48	24	28	SCL	16.9	20.1	12.9	3
T-110	SWT-45	Bw	60 - 65	10YR 4.5/2	1.29	38	51	32	17	L	12.5	15.3	9.8	1.4
T-111	SWT-46	Oa	1 - 9	7.5YR 2/3	0.56		64	28	8	SL	81.0	##	##	32.2
T-112	SWT-46	A	9 - 20	10YR 3/4	1.18	67	54	29	17	SL	25.8	##	##	6.2
T-113	SWT-47	Oa	1 - 5	7.5YR 2/2	0.67	8	50	24	26	SCL	62.2	****	****	29.2
T-114	SWT-47	A	5 - 23	10YR 3.5/3	1.85	28	56	30	14	SL	17.1	18.2	11	3.4
T-115	SWT-47	IIB	23 - 65	10YR 4/2	1.60	49	56	16	28	SCL	8.6	14.1	9.4	1.4
T-116	SWT-48	Oa	2 - 16	10YR 2.5/3	0.45	18	58	30	12	SL	35.0	****	****	32.3
T-117	SWT-48	B	16 - 45	10YR 5/5	1.73	34	50	24	26	SCL	9.8	18.3	11.5	3.9
T-118	SWT-49	Oa	4 - 14	7.5YR 2/2.5	0.26		72	20	8	SL	174.9	****	****	47.3
T-119	SWT-49	AB	14 - 30	10YR 3.5/3	1.79	48	64	18	18	SL	24.7	14	6.8	3.1
T-120	SWT-49	C	30 - 50	10YR 4/2	2.55	44	76	10	14	SL	5.5	4.3	3.2	0.6
T-121	SWT-50	Oa	7 - 14	7.5YR 2/2	0.45		36	58	6	SiL	142.1	57.8	54.5	27.3
T-122	SWT-50	A	14 - 43	10YR 3/3	1.32	42	50	23	27	SCL	15.0	19.8	10.6	4.7
T-123	SWT-50	IIBw	43 - 60	10YR 4/2	1.98	56	74	11	15	SL	5.4	7.9	4.8	0.5
T-124	SWT-51	Oe	4 - 9	7.5YR 2/1	0.14		****	****	****	****	282.4	****	****	50.1
T-125	SWT-51	Oa	9 - 24	10YR 2/2	0.38		36	56	8	SiL	188.0	82.1	68.2	29.6
T-126	SWT-51	IIBw	24 - 45	10YR 4/3	1.89	45	48	26	26	SCL	14.5	20.2	10.2	3.2
T-127	SWT-51	IIC	45 - 53	10YR 4/3	2.15	42	76	12	12	SL	12.9	7.2	4.1	0.5
T-128	SWT-52	Oi	0 - 4		0.04		****	****	****	****	405.4	****	****	78.7

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-129	SWT-52	Oe	4 - 9	7.5YR 2/2	0.07		****	****	****	****	327.4	****	****	69.2
T-130	SWT-52	Oa1	9 - 14	7.5YR 2/2	0.23		44	44	12	L	324.2	****	****	37.5
T-131	SWT-52	A	31 - 53	10YR 2.5/2	1.16	18	58	27	15	SL	41.1	36.1	18.4	5.2
T-132	SWT-53	Oi	0 - 7		0.04		62	36	2	SL	330.0	##	##	75.9
T-133	SWT-53	Oe	7 - 12		0.09		****	****	****	****	393.7	##	##	80.1
T-134	SWT-53	Oa	12 - 17	7.5YR 2/1.5	0.19		****	****	****	****	313.0	##	##	47.4
T-135	SWT-53	Mottles base of Oa		7.5YR 4/6	0.27		****	****	****	****	172.3	##	##	39.3
T-136	SWT-53	A	17 - 40	10YR 2/3	1.31	16	53	28	19	SL	40.0	##	##	6.5
T-137	SWT-54	Oi	0 - 8		0.03		****	****	****	****	469.6	****	****	93.3
T-138	SWT-54	Oe	8 - 15	7.5YR 2/1	0.08		****	****	****	****	510.6	179.2	158.4	89.3
T-139	SWT-54	Oa	15 - 21	7.5YR 2/3	0.17		66	30	4	SL	467.0	****	****	80.1
T-140	SWT-54	Bw	21 - 39	10YR 3.5/3	1.30	5	52	24	24	SCL	32.2	23.6	10.6	3.9
T-141	SWT-54	Cg	39 - 44+	10YR 4/1	1.80	6	56	24	20	SCL/S	20.0	13.2	5.9	2.2
T-142	SWT-55	Oe	0 - 10		0.22		##	##	##	##	554.7	##	##	63.1
T-143	SWT-56	Oa	8 - 21	7.5YR 2/2	0.14		****	****	****	****	521.4	147.4	126	84.8
T-144	SWT-56	B/O	21 - 34	10YR 3/2	0.46	0	43	31	26	L	154.9	82.6	55.2	45.9
T-145	SWT-57	Oe	2 - 36	7.5YR 2/3	0.16		****	****	****	****	577.2	****	****	76.7
T-146	SWT-57	Cg	36 - 56	10YR 4/1	0.70	0	20	32	48	C	63.2	40.7	26.2	6.7
T-147	SWT-58	Oa	3 - 8	5YR 2/1	0.16		****	****	****	****	445.8	****	****	92.2
T-148	SWT-58	Oe1	8 - 24	7.5YR 2/2.5	0.16		****	****	****	****	531.9	****	****	79
T-149	SWT-58	Cg	37 - 45+	N 4/0	1.18	0	10	33	57	C	39.9	31.5	21.7	6.5
T-150	SWT-59	A2	20 - 40	7.5YR 2/3	1.03		##	##	##	##	31.1	##	##	20.3

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-151	SWT-60	Bw	10		1.26		##	##	##	##	14.5	##	##	6.5
T-152	SWT-61	Oa2	8 - 16	7.5YR 2/2	0.37	0	46	48	6	SL	239.0	##	##	****
T-153	SWT-61	A2	16 - 40+	10YR 3/3	1.13	70	66	18	16	SL	12.9	##	##	5.4
T-154	SWT-62	Oe	3 - 13	7.5YR 2/2	0.30		##	##	##	##	339.9	##	##	51
T-155	SWT-63	Oa	1 - 8		0.54		##	##	##	##	137.9	##	##	44.8
T-156	SWT-63	Bw	8 - 21 +		0.90						35.7			
T-157	SWT-64	Bw	10		0.75		##	##	##	##	42.0	##	##	9.4
T-158	SWT-65	Oa	1 - 4	7.5YR 2/2	0.21		****	****	****	****	123.4	##	##	****
T-159	SWT-65	Bw1	4 - 18	7.5YR 3/4	1.02	46	44	26	30	CL	25.7	##	##	4.7
T-160	SWT-65	Bw2	18 - 35+	10YR 3/3	1.26	66	64	18	18	SL	7.6	##	##	1.9
T-161	SWT-66	A	9 - 20	7.5YR 3/3	1.82		##	##	##	##	21.2	##	##	8.6
T-162	SWT-67	Oa	3 - 24	10YR 2/2	0.42		##	##	##	##	209.2	##	##	60.3
T-163	SWT-67	A	24 - 37+	10YR 3/3	1.24						36.3			
T-164	SWT-68	Oa1	10 - 18	7.5YR 2/2	0.16		****	****	****	****	343.2	##	##	49.1
T-165	SWT-68	Oa2	18 - 27+	10YR 3/2	0.29	0	44	32	24	L	281.4	##	##	38.9
T-166	SWT-69	A	1 - 4	7.5YR 2/3	0.83		##	##	##	##	33.0	##	##	16.6
T-167	SWT-70	Oa2	7 - 11	7.5YR 4/3	0.74	0	58	30	12	SL	83.2	****	****	26.7
T-168	SWT-70	Bw	11 -21	7.5YR 4/5	0.65	58	72	8	20	SCL/S	9.6	****	****	2.5
T-169	SWT-70	C	21 - 30+	7.5YR 3.5/1.5	0.79	61	88	4	8	LS	8.7	****	****	2.5
T-170	SWT-71	Bw	1 - 5	7.5YR 5/5.5	1.10		##	##	##	##	20.7	##	##	4
T-171	SWT-71	BC	5 - 16	7.5YR 4/8	1.64						7.4			
T-172	SWT-71	C	16 - 46	10YR 3/2	2.24						3.5			

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-173	SWT-72	Oi2	4 - 19	7.5YR 2/2	0.14		##	##	##	##	426.1	##	##	94.7
T-174	SWT-73	Oa	6 - 8	7.5YR 3.5/3	0.30		60	28	12	SL	216.6	48.5	40	32
T-175	SWT-73	Bw	8 - 35	10YR 4.5/3	1.16	0	43	28	29	CL	29.9	33.4	10.6	3.6
T-176	SWT-74	Bw	10	10YR 4/3.5	1.04		##	##	##	##	37.5	##	##	7.4
T-177	SWT-75	Oi	0 - 5		0.02		****	****	****	****	901.7	172.9	137	89.3
T-178	SWT-75	Oe	5 - 10	7.5YR 2.5/4	0.17		****	****	****	****	389.3	246.8	178.9	19.2
T-179	SWT-75	Oa2	13 - 18	5YR 3/4	0.18		****	****	****	****	372.2	****	****	58
T-180	SWT-75	Bhs	18 - 31	10YR 3.5/3	0.38	0	40	45	15	L	178.8	****	****	38
T-181	SWT-76	Oa	10	7.5YR 2/2	1.19		##	##	##	##	26.5	##	##	21.2
T-182	SWT-76	A	30	7.5YR 3.5/4										
T-183	SWT-76	Cox		10YR 4/4										
T-184	SWT-77	Oi	0 - 6		0.05						244.2			
T-185	SWT-77	Oe	6 - 17	7.5YR 2/2	0.11						372.5			
T-186	SWT-77	Oa	17 - 32	7.5YR 2/2	0.20		##	##	##	##	393.4	##	##	71.5
T-187	SWT-78	Oa	3 - 22	7.5YR 2/2	0.25		##	##	##	##	535.7	##	##	53.2
T-188	SWT-78	O/C	22+	10YR 4/1	1.62						83.4			
T-189	SWT-79	Oi	0 - 4		0.02		****	****	****	****	850.8	##	##	83.3
T-190	SWT-79	Oe	4 - 7	7.5YR 2/2	0.10		****	****	****	****	535.4	##	##	66.8
T-191	SWT-79	Oe2	7 - 12	5YR 3/5	0.09		****	****	****	****	830.3	##	##	75.6
T-192	SWT-79	Oa	12 - 20	7.5YR 3.5/3	0.26		52	34	14	L/SL	283.0	##	##	50.9
T-193	SWT-79	II Cox	20 - 32+	10YR 4/5.3		0	46	28	26	SCL/L		##	##	5.9

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Horizon	Depth (cm)	Wet color	Bulk density (g/cc, 1/240)	% Gravel >2mm	% Sand	% Silt	% Clay	Texture	% Water	% Water	% Water	% OM
T-194	SWT-80		frost scar	NULL	1.55	NULL	##	##	##	##	43.0	##	##	11.6
T-195	SWT-81	Oi	0 - 6	7.5YR 5/4	0.04						1062.9			
T-196	SWT-81	Oe	6 - 10	5YR 2/2	0.08						866.0			
T-197	SWT-81	Oa	10 - 38	7.5YR 2/2	0.21		##	##	##	##	332.7	##	##	75
T-198	SWT-81	C	38+	10YR 4/1	1.11						52.8			
T-199	SWT-81	till from east side of Limno Bay				58	67	15	18	SL		##	##	1.5

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-001	SWT-1	5.6	0.8	10	11	97.2	22.3	820	467	8.5	##	##	##	##	##	35	18.8
T-002	SWT-1																
T-003	SWT-2	6.3	0.7	<1	5	105	10.1	63.7	152	1.7	6.23	0.82	0.08	0.27	0.4	8.3	
T-004	SWT-2	6.4	1.2	<1	2.3	51.1	18.2	67.7	560	4.1	9.09	1.51	0.06	0.12	0.5	12.6	
T-005	SWT-3	3.5	0.8	30	92	229	8.3	1500	15.2	1.5	##	##	##	##	##	25.3	87
T-006	SWT-4	5	0.9	10	14	156	60.3	3410	450	24.2	##	##	##	##	##	16	4.8
T-007	SWT-4																
T-008	SWT-5	4	0.5	<4	42.8	440	27.6	584	432	2.6	6.8	2.22	0.3	0.16	<0.1	16.5	70
T-009	SWT-5	4.1	0.4	<1	1.4	73.7	3.9	222	18.7	0.6	1.66	0.55	0.06	0.23	<0.1	6.9	9.4
T-010	SWT-5	4.6	1.2	<1	1.1	19.3	1.5	572	8.8	1.2	0.33	0.15	0.03	0.08	<0.1	7.8	3
T-011	SWT-5	4.9	0.2	2	2	24.5	1.3	410	7.9	1	0.24	0.08	0.02	0.07	<0.1	4.4	15.2
T-012	SWT-6	3.5	0.9	20	41	17.6	2.5	4000	5.2	3.2	##	##	##	##	##	15.1	25.6
T-013	SWT-7	5.1	1	20	25	212	8.9	307	125	1.3	##	##	##	##	##	15.7	51.4
T-014	SWT-7																
T-015	SWT-7																
T-016	SWT-8	3.9	0.8	2	4.4	97.3	13.8	1730	22.7	1.8	3.63	1.16	0.08	0.24	<0.1	14.2	35.6
T-017	SWT-8	4.5	0.4	1	0.8	61.3	1.9	499	34.5	1.7	2.59	0.81	0.05	0.11	<0.1	9.2	4.2
T-018	SWT-8	6.8	0.4	1	1.1	38.3	0.8	45.4	21.1	3.6	4.36	0.23	0.04	0.08	<0.1	4.9	
T-019	SWT-9	5.7	1	<10	17	19.2	11.1	807	581	7.2	##	##	##	##	##	67.7	24
T-020	SWT-9																
T-021	SWT-9																
T-022	SWT-10	5.9	1	<10	28	54.7	15.8	640	222	10.1	##	##	##	##	##	81.8	36.6
T-023	SWT-10																
T-024	SWT-11	4.6	0.6	<10	11	184	14.9	3640	261	34.6	8.71	1.72	0.6	0.38	<0.1	19.1	12.4
T-025	SWT-11	4.5	0.6	<4	2	100	10.4	2068	96.4	23.8	6.91	1.05	0.33	0.17	<0.1	10.7	1.2
T-026	SWT-12																
T-027	SWT-12																
T-028	SWT-12	4.6	0.5	40	17	98.7	15.1	2280	120	25.9	##	##	##	##	##	19.9	23.2
T-029	SWT-13	4.5	0.6	<1	2	101	32.4	1428	40	8.6	3.38	0.73	0.39	0.24	<0.1	18.2	32.6

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-030	SWT-13	4.3	0.9	<4	1.2	78.4	155	2420	149	16	5.1	0.47	0.23	0.12	<0.1	19.1	4
T-031	SWT-13	4.4	1.1	8	1.2	70	132	2572	337	16.2	7.28	0.37	0.35	0.08	<0.1	21.8	4.6
T-032	SWT-14	6.8	0.6	30	3	363	186	1510	1950	8.2	24.68	2.49	0.7	0.52	0.4	52	
T-033	SWT-14	5.4	0.3	20	14	69.1	24.6	797	138	13.3	38.25	3.11	0.79	0.16	<0.1	67.4	25.6
T-034	SWT-14	4.8	0.6	20	11	75.9	19.3	1630	411	28.3	31.04	2.52	0.67	0.14	<0.1	36	18.8
T-035	SWT-15	5	0.4	<10	28	123	17.4	1180	28.9	10.1	##	##	##	##	##	22.6	31.4
T-036	SWT-16	6.9	0.7	<10	11	48.2	2.3	281	58.5	7.7	##	##	##	##	##	25.5	
T-037	SWT-17																
T-038	SWT-17	5	0.7	<10	28	326	1.7	827	20.3	3.2	##	##	##	##	##	27.4	41
T-039	SWT-18	5.4	0.6	20	14	418	1.7	140	15.5	3	##	##	##	##	##	11.1	18.2
T-040	SWT-18																
T-041	SWT-19	4	0.5	10	64	449	6	687	3.8	2.9	##	##	##	##	##	20.8	32.4
T-042	SWT-19																
T-043	SWT-19																
T-044	SWT-20	5.9	0.9	10	23	403	6	304	106	4.2	##	##	##	##	##	77.5	24.8
T-045	SWT-20																
T-046	SWT-20																
T-047	SWT-21	6.8	0.6	<10	14	412	6	245	79.5	8.7	##	##	##	##	##	115.7	
T-048	SWT-21																
T-049	SWT-21																
T-050	SWT-22																
T-051	SWT-22	6.2	0.7	<10	28	464	17.3	820	234	5.9	##	##	##	##	##	112.5	
T-052	SWT-22																
T-053	SWT-22																
T-054	SWT-23	6.3	1.1	<10	38	499	33.4	287	966	7.1	##	##	##	##	##	111.3	
T-055	SWT-23																
T-056	SWT-24	5.6	0.8	20	11	32.6	22.1	2290	408	11.5	##	##	##	##	##	62	4.4
T-057	SWT-24																
T-058	SWT-25	3.8	0.9	30	47	228	18.1	3280	109	4.3	##	##	##	##	##	15.5	27.6

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-059	SWT-25																
T-060	SWT-26	4.4	0.7	8	22.8	452	30.8	760	1192	3.7	11.07	4.82	0.7	1.7	<0.1	29	124.8
T-061	SWT-26	4.5	0.8	4	2.8	39.9	3.3	551	71.8	3.3	1.7	0.68	0.13	0.14	<0.1	6.9	18.2
T-062	SWT-27	4.6	0.6	3	6.7	60.1	5.8	867	46.6	8.8	0.55	0.13	0.02	0.08	<0.1	4.7	29.6
T-063	SWT-28																
T-064	SWT-28	6.4	1	20	41	135	17.9	1100	594	17.5	##	##	##	##	##	116.6	
T-065	SWT-29	6	0.7	20	34	179	9	974	68	9.8	##	##	##	##	##	51.3	
T-066	SWT-29																
T-067	SWT-30	4.7	1.3	2	4.4	85.2	101	768	180	15.8	9.32	0.94	0.09	0.1	<0.1	19.3	30.4
T-068	SWT-31																
T-069	SWT-31																
T-070	SWT-31	6.4	0.8	20	34	89	3.5	389	94.2	4.3	##	##	##	##	##	47.6	
T-071	SWT-31																
T-072	SWT-32	4.1	0.6	30	25	19.8	11.1	3930	61	6.3	##	##	##	##	##	17.4	19.4
T-073	SWT-32																
T-074	SWT-33																
T-075	SWT-33	5.9	0.6	20	14	6.4	7.8	1340	119	7.8	##	##	##	##	##	51.8	10.2
T-076	SWT-34	6.9	1.5	20	95	380	149	81.4	568	3.8	108	10.89	0.58	0.89	1.8	137	
T-077	SWT-34	6.2	0.9	20	14	79	14.6	1800	716	6.6	84.89	8.1	0.55	0.12	1.1	97.6	
T-078	SWT-35	4.7	0.3	1	1.4	42.3	2.6	388	27.3	4	0.56	0.21	0.12	0.12	<0.1	3.9	14.4
T-079	SWT-36																
T-080	SWT-36																
T-081	SWT-36	4.1	0.7	40	23	14	10.5	5010	78	13.7	##	##	##	##	##	15.2	17.4
T-082	SWT-36																
T-083	SWT-37	5.6	0.4	30	<0	163	16.4	2130	114	6.9	36.02	3.26	0.74	0.37	0.9	67.6	4.2
T-084	SWT-37	6.1	1	1	0.5	49.5	10.7	635	177	19.9	9.16	2.28	0.12	0.12	0.6	26.6	
T-085	SWT-38	7	1	20	81	482	71.2	275	1220	3.7	83.6	8.59	0.63	1.07	3.8	114.3	
T-086	SWT-38	7.5	1.6	20	25	286	86.3	375	1790	3.6	****	****	****	****	****	83.1	****
T-087	SWT-38	5.9	0.3	20	5	114	64.3	1550	502	7.2	26.25	2.16	1.06	0.44	****	61.2	****

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-088	SWT-38	5.7	0.5	<1	0.5	56.3	2.9	395	135	13.9	7.99	0.78	0.07	0.17	0.3	11.5	8
T-089	SWT-39	6.8	1.2	20	231	961	156	32.2	572	3.4	84.18	11.42	0.73	2.58	1.7	113.6	
T-090	SWT-39	6.7	1	20	60	248	34	320	316	6.4	94.37	7.94	0.7	0.76	2	110.7	
T-091	SWT-39	6.1	0.9	1	1.1	62.7	1.5	287	9.1	9.9	8.62	1.26	0.07	0.2	<0.1	13	
T-092	SWT-40	5.3	0.5	12	33	194	10.1	876	74.8	3.7	54.76	5.14	0.57	0.71	****	77.7	****
T-093	SWT-40	6.2	0.6	3	1.7	57.2	1.4	340	33.2	60	9.17	2.09	0.09	0.17	0.4	25.4	
T-094	SWT-41	7.2	1.5	8	68.8	351	151	46	864	4.3	100	9.58	0.55	1.02	3	114.1	
T-095	SWT-41	6.9	1.1	8	4.4	34.4	6.6	808	369	6.3	45.63	3.83	0.33	0.2	1.5	55.2	
T-096	SWT-42	5.8	0.5	20	144	1430	96.1	17.3	218	2.6	43.23	8.1	0.84	3.17	1	86.1	****
T-097	SWT-42	6.8	1.1	20	89.6	484	100	145	532	11.5	88.68	8.08	0.7	1.45	1	104.3	
T-098	SWT-42	6.3	0.6	8	13.6	64.4	22	548	58	16.6	70.27	6.04	0.33	0.24	0.6	101.6	
T-099	SWT-42	5.6	0.5	2	0.8	67.9	2	352	15.1	8.3	8.37	1.1	0.09	0.24	<0.1	12.1	3.6
T-100	SWT-43	6.9	1	12	42.8	164	56.8	100	378	2.1	93.96	7.82	0.52	0.75	6.1	123.2	
T-101	SWT-43	6.3	0.7	8	13.6	72.4	4.8	216	64	8.2	54.88	4.55	0.28	0.18	0.8	70	
T-102	SWT-43	6.4	0.7	<1	0.3	45.8	1.8	116	22.8	5.1	7.69	0.95	0.1	0.16	0.2	10.5	
T-103	SWT-43	6	0.8	2	0.5	59.8	3.1	200	12	13.3	8.02	1.13	0.1	0.21	<0.1	14.1	
T-104	SWT-44	5.9	0.6	6	9.9	181	16.6	770	64.4	3.6	13.49	5.31	0.14	0.29	****	79.8	36.8
T-105	SWT-44	6.8	0.6	1	1.7	51	0.9	73.8	10.1	1.8	8.73	1.08	0.13	0.15	0.3	16	
T-106	SWT-45	6.2	1	20	205	926	110	38.8	170	4.4	79.84	8.62	0.57	3.14	1.1	95.8	
T-107	SWT-45	6.1	0.8	10	74	196	50.3	300	182	6.8	85.7	6.62	0.43	0.42	1.6	107.7	
T-108	SWT-45	6.4	0.6	<1	2.3	50	3.1	774	31.2	9.9	12.42	3.76	0.12	0.09	0.2	71.1	
T-109	SWT-45	6.8	0.6	4	2.5	46.2	1	109	11.8	4.9	8.1	1.13	0.13	0.17	0.4	17.4	
T-110	SWT-45	7.5	0.9	2	1.7	56.5	1.2	66.2	34.6	6.2	8.46	0.77	0.1	0.17	1.9	11.1	
T-111	SWT-46	4.4	0.6	4	7.6	84	4.1	860	18.4	1.1	7.82	2.52	0.36	0.44	<0.1	15.7	32.6
T-112	SWT-46	4.4	0.5	1	2.3	42.4	3.2	562	18.4	1.2	3.3	1.28	0.07	0.18	<0.1	10.7	8.8
T-113	SWT-47	5	0.9	14	11.1	468	34.8	718	462	3.2	17.68	2.6	0.35	0.6	0.2	25.3	63.4
T-114	SWT-47	4.9	0.5	5	1.1	43	1.3	192	35.8	1	3.72	0.81	0.31	0.2	<0.1	8.3	10
T-115	SWT-47	7.3	1.8	5	0.5	47.5	1.7	47	12.7	3.2	14.81	0.7	0.31	0.2	1.5	11.5	
T-116	SWT-48	6.4	1.2	8	13.5	346	3	78.2	45.3	1.2	11.56	1.53	0.38	1.19	1.1	49.4	

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-117	SWT-48	6.6	0.7	6	1.7	171	0.7	81.9	10.8	0.9	10.38	0.67	0.29	0.53	0.5	12.1	
T-118	SWT-49	4	0.5	8	38	114	7.7	1804	9.8	1.3	7.84	1.66	0.48	0.32	<0.1	17.1	84.4
T-119	SWT-49	5.3	0.7	4	1.7	26.8	3.8	371	24.8	1.1	4.13	0.59	0.25	0.15	0.2	7.6	12.8
T-120	SWT-49	7.6	0.6	4	0.8	24.7	0.7	37.7	3	1.1	7.48	0.36	0.21	0.13	0.8	5.4	
T-121	SWT-50	6.2	0.5	4	26.8	36.8	5.4	612	43.6	4.1	33.29	3.07	0.19	0.16	0.7	41.4	
T-122	SWT-50	6.7	0.7	7	1.7	31.9	1.2	132	10.6	2.6	12.23	1.17	0.28	0.16	0.5	18.9	
T-123	SWT-50	7.7	0.7	6	0.5	35.6	1.4	25	5.3	1.5	12.49	0.75	0.27	0.17	1.9	5.4	
T-124	SWT-51	6.4	0.8	10	78	494	68.4	174	245	4.6	32.51	4.07	1.21	0.55	****	77	****
T-125	SWT-51	6.7	0.7	4	12.4	43.6	11.9	277	110	5.9	40.79	5.38	0.22	0.09	1.5	56.2	
T-126	SWT-51	7.3	0.6	6	1.1	34.4	1.2	82.7	9.3	2.7	11.61	1.82	0.32	0.16	0.5	16.7	
T-127	SWT-51	7.9	0.6	5	0.3	29.6	0.9	22.9	6.9	1.5	8.85	0.85	0.29	0.15	1.8	5.4	
T-128	SWT-52	5.7	0.8	20	218	1790	124	61.9	363	4.8	59.25	7.33	0.9	3.37	1.3	69.7	****
T-129	SWT-52	6	0.8	4	98	912	143	48.8	860	5.4	65.86	7.11	0.51	1.34	2	80.6	
T-130	SWT-52	6.5	1.1	4	22.8	82	42.8	82.4	2012	3.5	47.55	4.25	0.3	0.12	2.1	63.3	
T-131	SWT-52	6.2	0.6	7	2	25.8	3.4	334	33.8	11.6	22.6	1.98	0.32	0.13	0.4	36.8	
T-132	SWT-53	5.8	0.6	20	111	996	55.8	40.4	264	4.1	49.88	7.43	0.91	2.63	1.7	100.3	****
T-133	SWT-53	6.1	0.7	20	92	479	55.1	84.6	310	4.8	63.31	7.48	0.8	1.91	1.9	75.8	
T-134	SWT-53	6	0.5	8	16.4	70.8	33.8	468	336	4.9	48.29	4.5	0.55	0.41	****	63.3	****
T-135	SWT-53	5.8	0.8	6	1	50.6	10.5	1168	44.2	11.4	34.08	3.29	0.65	0.23	0.6	42.6	3.6
T-136	SWT-53	5.3	0.6	2	1.7	44.3	2.8	442	25.1	11	8.32	1.16	0.09	0.13	<0.1	11.6	18.2
T-137	SWT-54	4.3	0.3	20	****	****	****	****	****	****	24.5	7.63	1.62	3.91	<0.1	36	****
T-138	SWT-54	6.2	0.6	<1	135	581	63.3	130	548	6.6	70.76	8.7	0.55	1.16	1.7	79.8	
T-139	SWT-54	5.4	0.6	20	50	70.3	23.1	1050	452	14.8	50.93	6.03	0.25	0.18	****	80.6	****
T-140	SWT-54	5.6	0.6	7	0.8	24.5	1.5	262	25	2.8	7.23	1.18	0.31	0.11	0.1	6.4	9.4
T-141	SWT-54	5	0.5	7	0.8	34.1	1.6	212	42.4	8.9	2.36	0.46	0.28	0.13	<0.1	4.1	19.8
T-142	SWT-55	6.4	0.7	20	3	83.7	9.8	859	549	3.6	##	##	##	##	##	44.6	
T-143	SWT-56	5.4	0.5	20	41	56.7	13.6	2210	570	6.4	11.92	0.64	0.18	0.05	<0.1	78.5	34.6
T-144	SWT-56	6.1	1.2	14	0.8	41.4	12.1	674	520	15.6	38.99	2.16	0.32	0.11	0.4	45.8	
T-145	SWT-57	5.6	0.5	20	34	89.5	38.4	3730	182	10.9	48.93	5.45	0.41	<0.01	****	62.2	****

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-146	SWT-57	5.2	1.4	4	0.8	75.4	27.2	436	92.4	25.4	14.97	2.26	0.31	0.23	<0.1	20.2	8.6
T-147	SWT-58	6.6	0.9	16	25.6	265	100	408	1356	4	72.02	7.54	0.48	0.44	****	69.3	****
T-148	SWT-58	6	0.3	10	34	79.6	37.2	477	65.8	16.2	27.05	2.54	0.27	0.06	****	62.2	****
T-149	SWT-58	5.2	1.1	7	0.5	69.1	19.5	364	119	27.7	7.41	1.1	0.33	0.24	<0.1	13.1	6.8
T-150	SWT-59	6.9	1.2	10	25	78.5	10.3	126	126	2.9	##	##	##	##	##	41.8	
T-151	SWT-60	4.7	0.6	10	11	32.9	1.4	457	57	0.7	##	##	##	##	##	6.1	11
T-152	SWT-61	6.4	0.7	<1	9.2	106	113	335	351	5.2	13	7.43	0.14	0.2	****	103.4	
T-153	SWT-61	7.1	0.7	2	2	49	3.2	108	44.5	3.8	8.85	1.34	0.17	0.12	****	11.1	
T-154	SWT-62	7.6	1.3	10	50	217	40.2	588	312	10.7	##	##	##	##	##	73.3	
T-155	SWT-63	4.2	0.8	10	64	45.5	2	1970	50.2	0.8	##	##	##	##	##	29.2	82.4
T-156	SWT-63																
T-157	SWT-64	4.6	0.4	10	11	<1	1.5	899	7.5	7.1	##	##	##	##	##	6.3	10.6
T-158	SWT-65	3.7	0.7	4	104	404	23.2	712	71.6	1.4	****	****	****	****	<0.1	16.1	****
T-159	SWT-65	4.3	0.4	1	2	29.7	3	485	105	1.4	0.94	0.31	0.04	0.07	<0.1	11.6	2.4
T-160	SWT-65	4.8	0.3	4	3.1	27.9	1.5	182	38.4	1.5	0.5	0.11	0.06	0.05	<0	5.3	25.6
T-161	SWT-66	4.4	0.6	10	14	<1	3.9	1210	148	1.7	##	##	##	##	##	9.6	13
T-162	SWT-67	6.2	0.8	10	67	48.5	8.1	876	75.1	4	##	##	##	##	##	71.4	
T-163	SWT-67																
T-164	SWT-68	6.9	1.3	12	10	284	103	924	1228	17.5	****	****	****	****	****	56.2	****
T-165	SWT-68	4.8	1.1	4	2.3	206	24	738	706	14.1	8.38	2.32	0.22	0.34	<0.1	31.4	7.4
T-166	SWT-69	3.8	0.7	10	20	16.2	4.9	964	8.3	0.9	##	##	##	##	##	13.3	28.4
T-167	SWT-70	3.8	0.7	7	6	18.8	1.4	1170	4.6	1	1.79	0.25	0.29	0.07	<0.1	16.5	18.6
T-168	SWT-70	4.3	0.3	7	1.1	17.1	1.2	390	23.4	0.7	1.29	0.32	0.28	0.08	****	7.1	****
T-169	SWT-70	5.1	0.6	6	2	18.4	0.6	254	13.5	1.9	6.55	0.57	0.28	0.1	****	7.9	****
T-170	SWT-71	4	0.6	10	8	<1	1.5	265	9	0.4	##	##	##	##	##	6.9	6.6
T-171	SWT-71																
T-172	SWT-71																
T-173	SWT-72	4.8	0.8	20	31	295	115	1880	194	4.1	##	##	##	##	##	31.2	19
T-174	SWT-73	4.3	0.5	4	12	101	14.3	1302	290	4.8	4.07	1.63	0.29	0.18	<0.1	14	<0

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 5. Soils data for Toolik lake permanent plots

Sample No.	Plot No.	Paste pH	Paste EC mmhos/cm	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ H-CO ₃ -DTPA Extract (ppm)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	NH ₄ OAc Extract (meq/100g)	% CaCO ₃ equivalent	meq/100g CEC	Bray# P ppm
				NO ₃ -N	P	K	Zn	Fe	Mn	Cu	Ca	Mg	Na	K			
T-175	SWT-73	4.6	0.3	6	1.1	21.9	1.7	540	16.2	3.8	0.78	0.25	0.25	0.12	<0.1	4.9	12.8
T-176	SWT-74	4.6	0.3	10	14	3.6	2.4	923	23.7	7.4	##	##	##	##	##	6.5	11
T-177	SWT-75	4.2	0.4	20	18.2	2520	103	277	1330	6.9	18.76	9.43	1.38	4.92	<0.1	33.3	****
T-178	SWT-75	5.2	1	<4	8	324	15.4	856	1912	5.8	8.72	3.8	0.48	0.77	<0.1	45	<0
T-179	SWT-75	4.5	0.5	8	15.2	102	25.5	3420	776	18.8	6.3	2.36	0.44	0.16	<0.1	24	****
T-180	SWT-75	4.3	0.4	<1	5	21.7	3.6	934	22.1	7.3	2.07	0.81	0.34	0.17	<0.1	13.3	14
T-181	SWT-76	4.5	1.1	20	70	411	4.8	1740	198	2.1	##	##	##	##	##	11.3	80
T-182	SWT-76																
T-183	SWT-76																
T-184	SWT-77																
T-185	SWT-77																
T-186	SWT-77	5.9	0.7	20	28	18	14.4	1420	299	28.4	##	##	##	##	##	82.2	128.4
T-187	SWT-78	4.6	0.5	20	11	260	33.1	6350	435	11.3	##	##	##	##	##	26.6	0.4
T-188	SWT-78																
T-189	SWT-79	4.5	0.5	40	167	2530	126	629	1990	6.7	35.83	14.79	3.34	7.86	<0.1	51.9	****
T-190	SWT-79	5.8	0.8	10	3	849	28.3	659	5410	5.2	13.63	6.52	0.87	2.46	1.5	53	7.2
T-191	SWT-79	4.5	0.6	20	8	379	36.2	4460	2320	13.4	15.67	5.89	0.91	1.04	<0.1	48.3	<0
T-192	SWT-79	4.2	0.5	8	15.2	133	19.6	3364	75.6	17.1	4.62	1.67	0.39	0.3	<0.1	23.2	17.2
T-193	SWT-79	4.5	0.4	2	2.8	38.7	2.8	745	24.8	4.9	1.1	0.36	0.08	0.07	<0.1	6.7	19.8
T-194	SWT-80	4.6	0.3	10	8	15.6	4.9	1960	21.7	10.6	##	##	##	##	##	6.1	5
T-195	SWT-81																
T-196	SWT-81																
T-197	SWT-81	4.8	0.5	10	38	140	18.7	1980	358	11	##	##	##	##	##	28.5	29.4
T-198	SWT-81																
T-199	SWT-81	7.1	0.4	2	3.1	65.3	1.1	98.1	4.1	2.7	7.54	0.86	0.16	0.18	0.4	10.2	

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41													
Shrub																																																						
<i>Andromeda polifolia</i>	+							+	+					+								+	+	+	+									r	+			r	+															
<i>Arctous alpina</i>					4			+	+										1													+																						
<i>Arctous rubra</i>															+								+	+	+										+	+				+	+			1										
<i>Betula nana</i> s.l.	r		4		r	4		1	1					r					1	+	r					3	3	+	+				3	r				4																
<i>Cassiope tetragona</i>	r		1					r	3	2									1	3	+	1	1	1	1	1						1		r	+								1											
<i>Diapensia lapponica</i> ssp. <i>obovata</i>					+			+												+																																		
<i>Dryas integrifolia</i>							+		2	2										+	2	3	3	3	3										1				r	2	3	2	2											
<i>Dryas octopetala</i>							3											+	3	+													1																					
<i>Empetrum nigrum</i> hermaphroditum						+		1	+										1			r			+	+							1				+			r														
<i>Ledum palustre</i> ssp. <i>decumbens</i>			4		+	+		1	1										2		+	r			2	3						2		+	1	+							+											
<i>Loiseleuria procumbens</i>	r				+			2											+	1																									+									
<i>Potentilla fruticosa</i>	1	1																																																				
<i>Potentilla palustris</i>																																																						
<i>Pyrola asarifolia</i>	+								+																+																													
<i>Rhododendron lapponicum</i>																						+	+	+												+					+	+	+	+										
<i>Rubus chamaemorus</i>											r											r				+	1	1	+				+						4															
<i>Salix</i> sp.		1																																																				
<i>Salix alaxensis</i>		4																																																				
<i>Salix arctica</i>																						+																								+	1	1	1					
<i>Salix chamissonis</i>	2	1																	r																1	1						1												
<i>Salix fuscescens</i>															r																															r	+							
<i>Salix glauca</i>									2												+			r																														
<i>Salix lanata richardsonii</i>		2																																																				
<i>Salix phlebophylla</i>			r		+		r	+												+	+	+			r																													
<i>Salix planifolia</i> ssp. <i>pulchra</i>		1																				+				2	1	2					2																					
<i>Salix reticulata</i>	1								1	1					+		3			+	2	2	2		1	r									+	3						1	3	2	2									
<i>Salix rotundifolia</i>																1																																						
<i>Spirea beauverdiana</i>																																																						
<i>Vaccinium uliginosum</i>	1		1		+	1	r	1	2	+										2	1	r	+	+	+	+	+						1	+	+					r	+	1												
<i>Vaccinium vitis-idaea minus</i>			3		3	4	r	+	+	+										+	+		r	r									3		+	+	3																	
Graminoid																																																						
<i>Arctagrostis latifolia</i>		r																				r	+																													+		
<i>Arctophila fulva</i>				3																																																		
<i>Bromus pumpellianus</i> s.l.																																																						
<i>Calamagrostis canadensis</i> s.l.	+	2	+			+																																																
<i>Calamagrostis inexpansa</i>																																																						

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41							
<i>Draba alpina</i>																																																
<i>Draba lactea</i>																																																
<i>Epilobium angustifolium angustifolium</i>																		3																														
<i>Epilobium latifolium</i>	+	+														+																																
<i>Erigeron hyperboreus</i>																																																
<i>Eutrema edwardsii</i>										r													+	+	+																							
<i>Gentiana propinqua ssp. arctophila</i>																																																
<i>Gentiana prostrata</i>																																																
<i>Geum glaciale</i>										+											+	2																					r					
<i>Hedysarum alpinum americanum</i>																																																
<i>Hippuris vulgaris</i>				+																																												
<i>Lagotis glauca minor</i>																+						+																					+	+	+			
<i>Melandrium affine</i>																																																
<i>Minuartia arctica</i>																																													+			
<i>Minuartia obtusiloba</i>								+													+																											
<i>Oxytropis sp.</i>																																																
<i>Oxytropis arctica</i>																					+	r																										
<i>Oxytropis campestris</i>																																																
<i>Oxytropis maydelliana</i>																																													+			
<i>Oxytropis nigrescens</i>																																																
<i>Papaver macounii</i>										+												+	+																						+			
<i>Parnassia kotzebuei</i>																																																
<i>Parnassia palustris</i>	+															r	+																											+				
<i>Parrya nudicaulis</i>																																																
<i>Pedicularis sp.</i>																																																
<i>Pedicularis capitata</i>	r									+							+	+		r	+	+	+	+	+	+					+				+							+	+	+				
<i>Pedicularis kanei kanei</i>							r			+											+																							r	+	+	+	
<i>Pedicularis labradorica</i>				r					+												+							+	+																+			
<i>Pedicularis langsdorffii arctica</i>	+																																															
<i>Pedicularis lapponica</i>																																														+		
<i>Pedicularis oederi</i>									+	+																																			r	+	+	+
<i>Pedicularis sudetica albolabiata</i>											+		+	+	+																														+			
<i>Pedicularis sudetica interior</i>																																														+		
<i>Petasites frigidus</i>									+	l																																			+	+	r	
<i>Polemonium acutiflorum</i>																																														+	+	

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41												
<i>Polygonum bistorta plumosum</i>	+		l			+		+	l	+						+	+		+	+				+	+	l														+													
<i>Polygonum viviparum</i>	+									r				+		+				+	+	+	+	+																		+	+	+	+								
<i>Potentilla biflora</i>																																											+										
<i>Potentilla hookeriana hookeriana</i>																	+													+																							
<i>Potentilla nivea</i>							+																							l																							
<i>Pyrola grandiflora</i>									+	+									+		+	+		+																					+								
<i>Pyrola secunda obtusata</i>								+														+																															
<i>Ranunculus gmelini gmelini</i>																																																					
<i>Ranunculus pallasii</i>				+																																																	
<i>Ranunculus pedatifidus</i>																																																					
<i>Rubus arcticus acaulis</i>																													l																								
<i>Sagina intermedia</i>																																																					
<i>Saussurea angustifolia</i>									l											+		+	+	l																									+				
<i>Saxifraga bronchialis funstonii</i>																																																					
<i>Saxifraga cernua</i>																																																					
<i>Saxifraga foliolosa</i>																																																					
<i>Saxifraga hieracifolia</i>							r																+																														
<i>Saxifraga hirculus propinqua</i>																																																					
<i>Saxifraga nelsoniana</i>									+								+																																				
<i>Saxifraga nivalis</i>	r																																																				
<i>Saxifraga reflexa</i>																		+	+		+																																
<i>Saxifraga tricuspidata</i>																																																					
<i>Senecio atropurpureus frigidus</i>																																																					
<i>Senecio lugens</i>	+	l																																																			
<i>Senecio resedifolius</i>																																																					
<i>Silene acaulis</i>																																																					
<i>Solidago multiradiata var. multiradiata</i>	+	+																																																			
<i>Stellaria laeta</i>									+									+	+																																		
<i>Thalictrum alpinum</i>																																																					
<i>Tofieldia coccinea</i>																																																					
<i>Tofieldia pusilla</i>	+									+							+																																				
Unknown dicot																																																					
<i>Utricularia vulgaris macrorrhiza</i>																																																					
<i>Valeriana capitata</i>	+	+																																																			
<i>Viola eipsila</i>																																																					

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41														
<i>Willemia physodes</i>	+	1																											+																										
<i>Zygadenus elegans</i>																																																							
Pteridophyte																																																							
<i>Cystopteris fragilis</i>																																																							
<i>Equisetum arvense</i>	1									2					1					+	3	+	+	2				1				2	+							+	2	2													
<i>Equisetum scirpoides</i>	1									1					+				+	+									+															+											
<i>Equisetum variegatum variegatum</i>	+									+																																		+	+										
<i>Lycopodium annotinum</i>	+																																																						
<i>Lycopodium selago appressum</i>														+					r																																				
<i>Selaginella selaginoides</i>																																																							
<i>Selaginella sibirica</i>							1												+																																				
Bryophyte																																																							
<i>Anastrophyllum minutum</i>			+							+								+			+	+				+	+																						+						
<i>Anthelia juratzkana</i>																																																		3					
<i>Aulacomnium acuminatum</i>	+																								+																								+	+					
<i>Aulacomnium palustre</i>	2															3														1																				1	2				
<i>Aulacomnium turgidum</i>			1			2			1	1			1					1	1	+	1	1	+	2	2								2					+	r	2			1	1	1				+						
<i>Barbilophozia barbata</i>																					+			+	+																									+					
<i>Barbula icmadophila</i>																																																							
<i>Blepharostoma trichophyllum brevirete</i>										+													+	+																															
<i>Brachythecium sp.</i>																																																							
<i>Brachythecium groenlandicum</i>		+																																																					
<i>Brachythecium stramineum</i>																																																							
<i>Brachythecium turgidum</i>										+																																													
<i>Bryoerythrophyllum recurvirostrum</i>																					+																																		
<i>Bryum sp.</i>							r														+	+																													+				
<i>Bryum angustirete</i>																					+																																		
<i>Bryum argenteum</i>																																																							
<i>Bryum pseudotriquetrum</i>	+	+								+	+																																												
<i>Calliergon giganteum</i>																																																							
<i>Calliergon richardsonii robustum</i>										+																																													
<i>Calliergon stramineum</i>																																																							
<i>Campylium arcticum</i>															1																																								
<i>Campylium stellatum</i>	+									+																																													
<i>Catocopium nigratum</i>																																																							

Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41				
<i>Ptilium cristum-castrensis</i>																																													
<i>Racomitrium canescens</i>	+																																												
<i>Racomitrium lanuginosum</i>			r					+	+					+									+																				2		
<i>Radula prolifera</i>																																													
<i>Rhizomnium andrewsianum</i>																						+																							
<i>Rhytidium rugosum</i>									2	+						+	+		+	2			+	+							2	r		1					+	+	1	1			
<i>Scapania</i> sp.									+					+																											+				
<i>Scapania paludicola</i>																																													
<i>Scapania simsonii</i>																						+	+																						
<i>Scapania subalpina</i>																																													
<i>Scorpidium scorpioides</i>				2									+	+		+													1	3									2						
<i>Scorpidium turgescens</i>																																													
<i>Sphagnum</i> sp.																																													
<i>Sphagnum angustifolium</i>																										1							1								3				
<i>Sphagnum aongstroemii</i>																						r			+	+																			
<i>Sphagnum balticum</i>																										2	3						1												
<i>Sphagnum contortum</i>																																													
<i>Sphagnum fimbriatum</i>																										1		1																	
<i>Sphagnum girgensohnii</i>									+					1										r	2	+	+					+							2						
<i>Sphagnum lenense</i>																										1								+											
<i>Sphagnum rubellum</i>	+									r			1								+	+		r	2	1						2	r	r			1								
<i>Sphagnum squarrosum</i>																																													
<i>Sphagnum teres</i>																							+																				2		
<i>Sphagnum warnstorffii</i>	+																										+	+																	
<i>Thuidium abietinum</i>																		1														2													
<i>Timmia</i> sp.									+																																				
<i>Timmia norvegica</i>																																													
<i>Tomentypnum nitens</i>	2	+							1	2				2		1																													
<i>Tortella fragilis</i>																																													
<i>Tortella tortuosa</i>																																													
<i>Tortula ruralis</i>																																													
<i>Trichostomum arcticum</i>																																											+		+
<i>Tritomaria quinqueidentata</i>									+	+								+			+	+	+																						
Unknown leafy liverwort	+															+		+							+													+			1		+		
Lichen																																													
<i>Alectoria minuscula</i>																																													
<i>Alectoria nigricans</i>																																													
<i>Alectoria ochroleuca</i>			+		+		+	+										1	+	+		+																					+	+	+

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41				
<i>Arthrurhaphis alpina</i>																																													
<i>Asahinea chrysantha</i>			+		+	+	1	+	+					+				+		+																				r		+	+		
<i>Buellia papillata</i>																																													
<i>Caloplaca</i> sp.								+																																					
<i>Caloplaca jungermanniae</i>																																													
<i>Cetraria andrejevii</i>																																													
<i>Cetraria cucullata</i>			1		1	1	+	1	1	1				+				+	1	+	+	+	1	+	+	+				r	+		+	+	+	r		+	+	1	+				
<i>Cetraria delisei</i>																																													
<i>Cetraria islandica</i>			+			+	+		+	+				+		r			+	1	+		+	+	+	+						+		+	+					+	1	+			
<i>Cetraria kamezatica</i>			+		+																																								
<i>Cetraria laevigata</i>																																													
<i>Cetraria nigricans</i>					+		+																																						
<i>Cetraria nivalis</i>			1		1	+	1	+		+								1		1			+							r			+						1		1	+			
<i>Cetraria tilesii</i>																																											1		
<i>Cladonia</i> sp.																																													
<i>Cladonia acuminata</i>																				+																				r					
<i>Cladonia amaurocraea</i>			+			+		+	+					+						+	+		+	+	+							+			+						+	+			
<i>Cladonia arbuscula</i>			2		+	2	+	1	1	1								+	1	1	+	+	+	+	+	+					+		+	+	r	+		r			2	+			
<i>Cladonia chlorophaea</i>																				+																									
<i>Cladonia coccifera</i>					+		+	+	+										1				+																		+		+		
<i>Cladonia digitata</i>																																													
<i>Cladonia ecmocyma</i>					+	1																																							
<i>Cladonia gracilis</i>			+		+			+	+	+									1				+	+	+	+						+			+		r		+	+	+				
<i>Cladonia macrophylla</i>	+				+																																								
<i>Cladonia mitis</i>			+											+																															
<i>Cladonia phyllophora</i>							+																																						
<i>Cladonia pleurota</i>					+	+		+											1					+		+																+			
<i>Cladonia pocillum</i>					+																																								
<i>Cladonia pyxidata</i>					+			+						+									+	+	+						r				+				+	+	+				
<i>Cladonia rangiferina</i>			1			2		+	1	+				+					1	1	+	+	+	+	+	+						+		+	+	r				+	1	+			
<i>Cladonia subfurcata</i>																																													
<i>Cladonia uncialis</i>			+		+		+	+	+										+																							+			
<i>Cladonia verticillata</i>																																													
<i>Cornicularia aculeata</i>							r	r																																					
<i>Cornicularia divergens</i>			+		1		1	+											1																							+		+	
<i>Dactylina arctica</i>			+		+	1		+	+	+				+						+	+	+	+	+	+	+	+					+		+	r			+		+					
<i>Hypogymnia physodes</i>					1															+																									
<i>Hypogymnia subobscura</i>							+												+																									+	

Table 6. Toolik Lake permanent plot species data

Plot number >>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
<i>Icmadophila ericetorum</i>																																											
<i>Lecanora epibryon</i>							+																																		+	+	
<i>Lecidea vernalis</i>																																											
<i>Lopadium fecundum</i>																																											
<i>Masonhalea richardsonii</i>			2		+	1	r		1	+								1	1					+		+						+								+	1	+	
<i>Nephroma arcticum</i>																											+																
<i>Nephroma expallidum</i>																			+	+																							
<i>Ochrolechia frigida</i>								+	+	+														+																			
<i>Ochrolechia upsaliensis</i>								+																+																			
<i>Pannaria pezizoides</i>																																											
<i>Parmelia septentrionalis</i>						+		+											+																								
<i>Peltigera</i> sp.																																											
<i>Peltigera aphthosa</i>								r		+	+						+				+	+	+		+		+				+			+						+	+	+	
<i>Peltigera canina</i>								r	+										+					+	+	+					+										+		
<i>Peltigera polydactyla</i>																																											
<i>Peltigera scabrosa</i>			+																																								
<i>Peltigera spuria soredata</i>																																											
<i>Pertusaria</i> sp.																				+																							
<i>Pertusaria bryontha</i>																																											
<i>Pertusaria dactylina</i>						+																																				1	+
<i>Pertusaria panyrga</i>																				+																							
<i>Psoroma hypnorum</i>								+	+																																		
<i>Solorina bispora</i>																																											
<i>Solorina crocea</i>																																											
<i>Sphaerophorus globosus</i>						1		+	+	+									+	+	+																					+	+
<i>Stereocaulon</i> sp.															+																												
<i>Stereocaulon alpinum</i>			+		+	+	+	3		+						+		+	2	1	+					+					+				+								
<i>Stereocaulon condensatum</i>																			+																								
<i>Stereocaulon tomentosum</i>										1																																	
<i>Sticta arctica</i>																																											
<i>Thamnia subuliformis</i>			+		+	+	1	+	+	1								2	1	+		+	+	+		+					+		+	+					+	1	+		
Unknown crustose lichen								r																																			1
Algae																																											
<i>Nostoc commune</i>				+																																							1

Table 6. Toolik Lake permanent plot species data

Plot number >>	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81							
<i>Luzula multiflora</i>					+		+		r																																						
<i>Luzula wahlenbergii</i>																																															
<i>Poa</i> sp.																																															
<i>Poa alpigena</i>									+												+																										
<i>Poa alpina</i>																						+																									
<i>Poa arctica</i>							+														+						+																				
<i>Poa glauca</i>							+	2										+																													
<i>Poa lanata</i>						+	+																																								
<i>Tricophorum caespitosum</i>															+		+	+																													
<i>Trisetum spicatum spicatum</i>																																															
Forb																																															
<i>Aconitum delphinifolium delphinifolium</i>																					+																										
<i>Aconitum delphinifolium paradoxum</i>							1											+	r		+																										
<i>Androsace chamaejasme lehmanniana</i>																			+																												
<i>Anemone drummondii</i>							+	+											1																												
<i>Anemone parviflora</i>	+				+																+																										
<i>Anemone richardsonii</i>									1	1	1										1						+	1																			
<i>Antennaria friesiana</i> s.l.							+																																								
<i>Arnica alpina</i>							+	1		+											1																										
<i>Arnica frigida</i>																					+																										
<i>Arnica lessingii</i>																						+																									
<i>Artemisia arctica</i> s.l.							+	+											1	+	+	1																									
<i>Artemisia tilesii tilesii</i>																																															
<i>Aster sibiricus</i>																																															
<i>Astragalus umbellatus</i>				1		+																																									
<i>Boykinia richardsonii</i>									2	+	+																																				
<i>Bupleurum triradiatum</i>							+	+													+																										
<i>Caltha palustris arctica</i>																																															
<i>Cardamine bellidifolia</i>																																															
<i>Cardamine hyperborea</i>									+	+																																					
<i>Cardamine pratensis angustifolia</i>																																															
<i>Cerastium beeringianum</i>								+													+																										
<i>Chrysosplenium tetrandrum</i>																																															
<i>Claytonia bostockii</i>					+																																										
<i>Dodecatheon frigidum</i>											+	+									+	+																									
<i>Draba</i> sp.				+			+	+																																							

Table 6. Toolik Lake permanent plot species data

Plot number >>	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	
<i>Draba alpina</i>				+																																					
<i>Draba lactea</i>										+																															
<i>Epilobium angustifolium angustifolium</i>																		l	+																						
<i>Epilobium latifolium</i>																				+																					
<i>Erigeron hyperboreus</i>						+																																			
<i>Eutrema edwardsii</i>											+	+																													
<i>Gentiana propinqua ssp. arctophila</i>																																									
<i>Gentiana prostrata</i>				+							r										+																				
<i>Geum glaciale</i>			+	+	r			+																																	
<i>Hedysarum alpinum americanum</i>																			+																						
<i>Hippuris vulgaris</i>																																									
<i>Lagotis glauca minor</i>		+																																				+			
<i>Melandrium affine</i>																				+																					
<i>Minuartia arctica</i>		r	+						r											+																		+			
<i>Minuartia obtusiloba</i>						+	+														+																				
<i>Oxytropis sp.</i>																					+																				
<i>Oxytropis arctica</i>																																									
<i>Oxytropis campestris</i>						+														l																					
<i>Oxytropis maydelliana</i>			l		l	+																																			
<i>Oxytropis nigrescens</i>						+															+																				
<i>Papaver macounii</i>		+	+						+	+	+																												+		
<i>Parnassia kotzebuei</i>											+	+										+																			
<i>Parnassia palustris</i>										+												+																			
<i>Parrya nudicaulis</i>									+	+	+																														
<i>Pedicularis sp.</i>																																									
<i>Pedicularis capitata</i>	+	+		+	+	+	+	+	+	+	+	+	r						+			+															+	+			
<i>Pedicularis kanei kanei</i>	+	+	+	+	+	+				+					+																										
<i>Pedicularis labradorica</i>	+																							+	+					+										+	
<i>Pedicularis langsdorffii arctica</i>										+	+	+			+																										
<i>Pedicularis lapponica</i>													+																			+		r			+	+		+	
<i>Pedicularis oederi</i>	+	+	+	+							+				+																									r	
<i>Pedicularis sudetica alboblabiata</i>														l		+	+																								
<i>Pedicularis sudetica interior</i>										r												+																			
<i>Petasites frigidus</i>										+	l										+					+							+			+	l				
<i>Polemonium acutiflorum</i>										+											l						+	+													

Table 6. Toolik Lake permanent plot species data

Plot number >>	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81					
<i>Hypnum bambergeri</i>	+	+	+	+											+																														
<i>Hypnum cupressiforme</i>				+																					2																				
<i>Hypnum lindbergii</i>																+											+																		
<i>Hypnum pratense</i>																																													
<i>Lophozia</i> sp.																																								1					
<i>Lophozia binsteadii</i>												+	+																																
<i>Lophozia quadriloba</i>										+																																			
<i>Lophozia rutheana</i>																																													
<i>Lyellia aspera</i>											+	+																																	
<i>Marchantia alpestris</i>																																													
<i>Meesia triquetra</i>													+			1	+																												
<i>Meesia uliginosa</i>				+							+	+					+																												
<i>Mesoptychia sahlbergii</i>																																													
<i>Mnium</i> sp.																																												+	
<i>Mnium blytii</i>											+																																		
<i>Mnium spinosum</i>											+																																		
<i>Myurella julacea</i>																																													
<i>Oncophorus virens</i>																																													
<i>Oncophorus wahlenbergii</i>			+		3												+	+																											
<i>Ondontoschisma macounii</i>																																													
<i>Orthothecium chryseum</i>			+										+		+		+																												
<i>Paludella squarrosa</i>												r	r															+																	
<i>Philonotis fontana pumila</i>																																													
<i>Plagiochila arctica</i>																																													
<i>Plagiomnium ellipticum</i>								+														+						+	1																
<i>Plagiomnium medium</i>													+																																
<i>Pleurozium schreberi</i>																																													
<i>Pogonatum urnigerum</i>																																													
<i>Pohlia andrewsii</i>																																													
<i>Pohlia cruda</i>								+	+			+																																	
<i>Pohlia nutans</i>																																													
<i>Politrichastrum alpinum</i>																																													
<i>Polytrichum commune</i>																																													
<i>Polytrichum hyperboreum</i>																																													
<i>Polytrichum juniperinum</i>				+			1		+	+	+	+			+		r							1	+				+																
<i>Polytrichum piliferum</i>					+	+													1				+	+				+		1															
<i>Polytrichum strictum</i>	+		+		1	+		1			+														2	1				+	1											+			
<i>Ptilidium ciliare</i>	1	+	+	1							+		1		1											+																	1		

Table 6. Toolik Lake permanent plot species data

Plot number >>	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81								
<i>Arthrorhaphis alpina</i>																			+																													
<i>Asahinea chrysantha</i>	+	+	1	+	+	+		+				+			+	r	+	+										+							+													
<i>Buellia papillata</i>																			+																													
<i>Caloplaca</i> sp.							1												+																													
<i>Caloplaca jungermanniae</i>																			+																													
<i>Cetraria andrejevii</i>								+																																								
<i>Cetraria cucullata</i>	+	+	2	+	2	1	+	+		r	+	+		2		+	+	+	+		2	+	2	+			2	1	2		+	+	+	+	+			+	+									
<i>Cetraria delisei</i>																												r																				
<i>Cetraria islandica</i>	+	+	+	+	+			+	+	r		+		1		r	+	+	1		+	r	+	+			+	+	1		+	+	+	+	+			+	+									
<i>Cetraria kamezatica</i>																																																
<i>Cetraria laevigata</i>				+																																												
<i>Cetraria nigricans</i>						+																																										
<i>Cetraria nivalis</i>	+	+	1	+	1	1		+			+	+		+		r		+		1		1					1		2								+						+					
<i>Cetraria tilesii</i>			+			+																																										
<i>Cladonia</i> sp.				+		+														+								+																+				
<i>Cladonia acuminata</i>																												+																				
<i>Cladonia amaurocraea</i>	+	+			+	+		+		r	+	+		+		r		+	+	+	+	+	+				+	+	+		+	+	+		+	+	+		+			+	+					
<i>Cladonia arbuscula</i>	+	+	+	+	+			+			+	+		1		r	+		+	+	+	2	1				1	1	2		+	+	r		+				r	+								
<i>Cladonia chlorophaea</i>					+							+																																				
<i>Cladonia coccifera</i>					+														+																													
<i>Cladonia digitata</i>																	+																															
<i>Cladonia ecmocyna</i>																				+						+																						
<i>Cladonia gracilis</i>		+			+			+		r	+	+		+							+	+							+	+		+	+		+	+		+					+					
<i>Cladonia macrophylla</i>				+															+	+									+																			
<i>Cladonia mitis</i>																											+																					
<i>Cladonia phyllophora</i>																																																
<i>Cladonia pleurota</i>	+																					+	+						+	+																		
<i>Cladonia pocillum</i>			+																+																													
<i>Cladonia pyxidata</i>	+	+	+	+	+	+	+	+							+	+	+	+	+		1		+					+	+	+		+	+		+	+		+	+			r	r					
<i>Cladonia rangiferina</i>	+	+		+	+			+		r	+	+		1			+	+	+	+	+	1	1				1	1	1		+	+				+										+		
<i>Cladonia subfurcata</i>	+			+	+																																											
<i>Cladonia uncialis</i>				+							r						+	+		+	+	+									+																	
<i>Cladonia verticillata</i>																																														1		
<i>Cornicularia aculeata</i>																			+																													
<i>Cornicularia divergens</i>			+		+	1		+											+		1		1					1		1																		
<i>Dactylina arctica</i>	+		+	+	+			1	+	r	r	+	+		+									+	+			+	+	+		+	+	r						r	+							
<i>Hypogymnia physodes</i>																																																
<i>Hypogymnia subobscura</i>					+	1													+																													

Table 6. Toolik Lake permanent plot species data

Plot number >>	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81					
<i>Icmadophila ericetorum</i>													+																																
<i>Lecanora epibryon</i>						+	r								r																														
<i>Lecidea vernalis</i>			+																																										
<i>Lopadium fecundum</i>			2																																										
<i>Masonhalea richardsonii</i>		+	+	+	+			l	+	+	r	+			+		+	+	+	+	l	l					+	2	+									+							
<i>Nephroma arcticum</i>								l	+				r																																
<i>Nephroma expallidum</i>				r		+																																							
<i>Ochrolechia frigida</i>					+														+			+																							
<i>Ochrolechia upsaliensis</i>													+						l																										
<i>Pannaria pezizoides</i>		+																																											
<i>Parmelia septentrionalis</i>						+															+																								
<i>Peltigera</i> sp.												+																																	
<i>Peltigera aphthosa</i>	+	+	+	+		+		+	+	+	+	+	+					+		+									+				+	+	+	+	+					+			
<i>Peltigera canina</i>			+		+	+	+	+	+	+		+						l	+									r	+			+	r		+	+									
<i>Peltigera polydactyla</i>	+												+							+																						+			
<i>Peltigera scabrosa</i>													+																																
<i>Peltigera spuria sorediata</i>				r																																									
<i>Pertusaria</i> sp.		+				+																																							
<i>Pertusaria bryontha</i>																				+																									
<i>Pertusaria dactylina</i>	+	+	2		+										+								+								+												r		
<i>Pertusaria panyrga</i>																																													
<i>Psoroma hypnorum</i>					+			+																																					
<i>Solorina bispora</i>			+				+																																						
<i>Solorina crocea</i>																																												+	
<i>Sphaerophorus globosus</i>		r			+	+		+											+		+		l						2	+															
<i>Stereocaulon</i> sp.																																													
<i>Stereocaulon alpinum</i>								l	+	r	r				+				+			l							3	l	l								+						
<i>Stereocaulon condensatum</i>																																													
<i>Stereocaulon tomentosum</i>			+	+																								r																	
<i>Sticta arctica</i>																																													
<i>Thamnolia subuliformis</i>	+	l	l	+	l	l		+			r	+			+		r	+	+	+	l	+	+				l	+			l				+				+		+	r			
Unknown crustose lichen					l														+			+	3																						
Algae																																													
<i>Nostoc commune</i>																													+																l

Walker D.A. and Barry N. 1991. Toolik Lake permanent vegetation plots: site factors, soil physical and chemical properties, plant species cover, photographs, and soil descriptions. Data Report 48, Department of Energy R4D Program, Institute of Arctic and Alpine Research, University of Colorado, Boulder, CO.

Appendix

Selected Soil Descriptions

Plot SWT-2 Soil Description

Classification: Pergelic Cryoboroll, sandy, mixed.

Location: South end of Toolik Lake along inlet stream, 68°37' N, 149°36' W.

Physiographic position: Active floodplain.

Topography: Featureless, < 2 percent slope.

Drainage: Moderately well drained, flooded annually.

Vegetation: Moist *Salix alaxensis*, *Aster sibirica*, *Calamagrostis canadensis*, *Potentilla fruticosa* tall shrubland.

Parent material: Fine textured alluvium.

Sampled by: D.A. Walker and C. Westberg, August 1, 1989.

Remarks: Shrubs: > 2 m. Profile described to contact with underlying coarse river gravel.

Weather: Cool, cloudy.

Colors are for the moist soil.

- A1 0-10 cm. Very dark brown (7.5YR 2/2.5) sand; weak medium granular structure; damp; very friable (moist), gritty, non-sticky, non-plastic (wet); highly-organic; pH = 6.3; many very fine and fine roots; est. 2 percent fine gravel less than 0,5 cm diameter; clear, smooth boundary. (Sample T-003).
- A2 10-46 cm. Very dark brown (10YR 2.5/3) sandy loam; weak medium subangular blocky structure; damp to moist; friable (moist), gritty, very slightly sticky, slightly plastic (wet); pH = 6.4; common very fine and few fine roots; est. 5 percent fine gravel less than 2 cm diameter; abrupt, smooth boundary. (Sample T-004).
- IIC 46+ cm. Coarse river cobbles.

Plot SWT-5 Soil Description

Classification: Pergelic Cryochrept, sandy-skeletal, mixed.

Location: South side of Toolik Lake, 68°37' N, 149°36' W.

Physiographic position: Top of glacial outwash terrace.

Topography: High centered polygons 6-8 m diameter, 20-40 cm height.

Microrelief height: 2-5 cm.

Drainage: Well drained terrace bluff.

Vegetation: Dry *Arctous alpina*, *Hierochloe alpina* dwarf-shrub, fruticose-lichen tundra.

Parent material: Itkillik II outwash.

Sampled by: D.A. Walker and C. Westberg, August 2, 1989.

Remarks: Deep active layer, but very rocky soil.

Weather: cold, raining.

Colors are for moist soil.

- Oa 0-8 cm. Very dark brown (7.5YR 2/2) sapric organic material with est. < 5 percent silt loam; moderate fine granular structure; damp; smooth, slightly sticky, slightly plastic (wet); pH = 4.0; many fine and very fine roots; abrupt, irregular boundary. (Sample T-008).
- Bw 8-12 cm. Brown (7.5YR 4.5/4) cobbly sandy loam; weak medium subangular blocky structure; damp; friable (moist), gritty, slightly sticky, slightly plastic; pH = 4.1; common fine and many very fine roots; est. 75 percent gravel and cobbles to 10 cm diameter; clear, irregular boundary. (Sample T-009).
- Bw2 12-39 cm. Strong brown (7.5YR 4.5/6) very gravelly sandy loam; moderate medium subangular blocky structure; damp; slightly gritty, smooth, plastic; pH = 4.6; common fine roots; est. 80 percent gravel and cobbles to 20 cm diameter; wavy, clear boundary. (Sample T-010).
- C 39-45+ cm. Dark yellowish brown (10YR 3/4) very gravelly loamy sand; single grained; damp; gritty, nonsticky, nonplastic; pH = 4.9; no roots; est. 90 percent gravel to 15 cm diameter. (Sample T-011).

Plot SWT-11 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: South side of Toolik Lake, SW of inlet bay - final plot in toposequence, including SWT-7, 8, 9 and 10. 68°37' N, 149°36' W.

Physiographic position: Strangmoor in fen (wet element).

Topography: Colluvial basin. Flat featureless ground.

Microrelief height: < 5 cm.

Drainage: Very poorly drained with 5 cm of standing water.

Vegetation: Wet *Carex chordorrhiza*, *Carex rotundata*, *Scorpidium scorpioides* sedge tundra.

Parent material: Colluvial deposit on Itkillik II outwash

Sampled by: D.A. Walker and C. Westberg, August 3, 1989.

Remarks: Frozen at 40 cm.

Weather: warm, broken high clouds.

Colors are for wet soil.

- Oi 0-5 cm. Dark brown (7.5YR 3.5/3) fibric material with est. < 5 percent silt; after rubbing 70 percent recognizable plant fibers mostly roots; saturated; clear, smooth boundary.
- Oe 5-25 cm. Dark brown (7.5YR 3.5/3) hemic material with est. < 5 percent sandy loam; after rubbing 10-20 percent recognizable plant fibers, mostly of sedge roots and leaves; saturated; pH = 4.6; abrupt, smooth boundary.
(Sample T-024).
- Oa 25-40 cm. Dark brown (7.5YR 3/3) sapric material, est. 5 percent sandy loam; massive; saturated; smooth, nonsticky, nonplastic (wet); pH = 4.5.
(Sample T -025).

Plot SWT-13 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: South side of Toolik Lake, 20 m NW of SWT-12 in sedge marsh, at the edge of small pond, 68°37' N, 149°36' W.

Physiographic position: Colluvial basin. Margin of a small pond.

Topography: Flat, featureless ground.

Microrelief height: < 5 cm.

Drainage: Very poorly drained, with patches of standing water.

Vegetation: Wet *Eriophorum angustifolium*, *Carex rotundata* sedge tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 4, 1989.

Remarks: Frozen at 60 cm.

Weather: warm, clear.

Colors are for the wet soil.

- Oi 0-15 cm. Dark brown (7.5YR 3/3) fibric material; after rubbing est. 50 percent fiber content (sedge roots); saturated; 60 percent of material is a fine organic iron-rich precipitate; pH = 4.5; many fine and very fine roots; clear, smooth boundary. (Sample T-029).
- Oe 15-30 cm. Dark brown (7.5YR 3/5) hemic material; saturated; up to 80 percent fine organic iron-rich precipitate; pH = 4.3; many fine and very fine roots; abrupt, smooth boundary. (Sample T-030).
- Oa 30-40+ cm. Dark brown (7.5YR 3/5) fine organic material; massive structure; very saturated; soil is almost 100 percent organic iron-rich precipitate; few very fine roots. (Sample T-031).

Plot SWT-14 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: South side of Toolik Lake, directly west of inlet bay. 68°37' N, 149°36' W.

Physiographic position: Colluvial basin.

Topography: Strangmoor and aligned hummocks in fen.

Microrelief height: 0-5 cm.

Drainage: Poorly drained.

Vegetation: Moist *Trichophorum caespitosum*, *Tomentypnum nitens* sedge tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 4, 1989.

Remarks: Frozen at 55 cm. Profile described from aligned hummock element.

Weather: Clear, warm, windy.

Colors are for the moist soil.

- Oi 0-6 cm. Very dark brown (7.5YR 2/2.5) fibric material; after rubbing 50 percent recognizable plant fibers; very wet; composed mainly of coarse *Trichophorum caespitosum* roots; many fine and very fine roots; pH = 6.8; clear, smooth boundary. (Sample T-032).
- Oe 6-30 cm. Dark brown (7.5YR 3/3.5) hemic material; after rubbing 10 percent recognizable plant fibers; very wet; composed of fine sedge roots; pH = 5.4; abrupt, smooth boundary. (Sample T -033).
- Oa 30-40+ cm. Very dark brown (10YR 3/3) sapric material; after rubbing est. 10-15 percent recognizable plant fibers, mostly roots; saturated; pH = 4.8. (Sample T-034).

Plot SWT-26 Soil Description

Classification: Pergelic Cryaquept, fine-loamy, mixed, acid.

Location: Southwest side of Toolik Lake on long hillside near Shaver's greenhouses (SW corner). 68°37' N, 149°37' W at UTM grid stake 7,614,500 N, 393,900 W.

Physiographic position: Midslope of long gentle (5 percent) N-facing slope.

Topography: Hummocky terrain, including turf hummocks; many tussocks.

Microrelief height: 15 cm.

Drainage: Moderately well drained.

Vegetation: Moist *Eriophorum vaginatum*, *Betula nana*, *Sphagnum* sp. tussock-sedge, dwarf-shrub tundra.

Parent material: Itkillik I glacial till

Sampled by: D.A. Walker and C. Westberg, August 6, 1989.

Remarks: Frozen at 46 cm. Considerable evidence of cryoturbation in B horizon.

Weather: Broken clouds, very warm, light wind.

Colors are for the moist soil

- Oi 0-4 cm. Loose mat of alive and dead mosses (*Aulacomnium turgidum*, *Dicranum* sp., *Hylocomium splendens*); smooth, abrupt boundary.
- Oe 4-7 cm. Very dark brown (7.5YR 2/2) hemic material, est. < 2 percent by volume silt loam; loose (est. pore space 50 percent); weak medium platy structure; smooth, slightly sticky, slightly plastic (wet); smooth, clear boundary.
- Oa 7-10 cm. Dark brown (10YR 3/3) loamy-sapric material; weak medium platy structure; wet; smooth, slightly sticky, plastic (wet); pH = 4.4; many fine and very fine roots; abrupt, smooth boundary. (Sample T-060).
- Bw 10-40+ cm. Predominantly dark yellowish brown (10YR 3/4) gravelly sandy clay loam with many large brown mottles (10YR 4/6), plus areas of dark greyish brown (10YR 4/2) material; from moderate medium subangular blocky to moderate fine granular structure; firm (moist) gritty, sticky, plastic (wet); pH = 4.5; few fine roots; est. 15 percent by volume fine gravel < 1 cm diameter; thin dark greyish brown (10YR 4/2) band of silty, highly organic material at base of B horizon. (Sample T-061).

Plot SWT-27 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: West side of Toolik lake, in water track, 68°38' N, 149°38' W.

Physiographic position: Midslope of small drainage, gentle (5 percent) N-facing slope.

Topography: Well defined hill slope water track.

Microrelief height: hummocks up to 20 cm.

Drainage: Very poorly drained.

Vegetation: Wet *Eriophorum angustifolium*, *Sphagnum* sp., *Salix planifolia* ssp. *pulchra* sedge, low-shrub tundra.

Parent material: Retransported fine alluvium.

Sampled by: D.A. Walker and C. Westberg, August 6, 1989.

Remarks: Frozen at 60 cm.

Weather: Clear, very warm.

Colors are for the wet soil.

- Oi 0-9 cm. Loose mat of sedge leaves and moss (*Eriophorum angustifolium* and *Sphagnum squarrosum*); clear and smooth boundary.
- Oa 9-19 cm. Very dark brown (7.5YR 2/2) sapric material, mainly composed of dead sedge leaves, after rubbing est. 5 percent recognizable plant fibers; saturated; loose, highly porous; abrupt, smooth boundary.
- B/O 19-40+ cm. Predominantly very dark grayish brown (10YR 3/2) highly organic loam, mixed with pockets of pure sapric organic material; few brown (10YR 4/3) mottles, particularly around dead *Sphagnum*; weak, medium, subangular blocky structure; saturated; gritty, slightly plastic, slightly sticky (wet); pH = 4.6; few sedge roots. (Sample T-062).

Plot SWT-30 Soil Description

Classification: Pergelic Cryofibrist, euic.

Location: South side of Toolik Lake in water at edge of inlet bay. 68°37' N, 149°36' W.

Physiographic position: Lake.

Topography: Flat lake bottom.

Drainage: Very poorly drained, ponded.

Vegetation: Aquatic *Arctophila fulva* grass marsh.

Parent material: Lacustrine deposit.

Sampled by: D.A. Walker, C. Westberg, August 16, 1989.

Remarks: Frozen at 57 cm.

Weather: overcast, cool.

Colors are for the wet soil.

- Oi 0-40 cm. Very dark grayish brown (10YR 3/2) fibric material, composed of live and dead *Scorpidium scorpioides* peat and *Arctophila fulva* roots; saturated; abrupt smooth boundary.
- A 40+ cm. Very dark grayish brown (10YR 3/2) organic loam; pH = 4.7; saturated. (Sample T-067).

Plot SWT-32 Soil Description

Classification: Histic Pergelic Cryaquept, fine, mixed, acid.

Location: West side of Toolik Lake, in tussock tundra adjacent to SWT-35 on frost scar. 68°38' N, 149°38' W.

Physiographic position: Sideslope of 7 percent N-facing slope.

Topography: Hummocky terrain, including turf hummocks.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Eriophorum vaginatum*, *Betula nana*, *Sphagnum rubellum* tussock-sedge, dwarf-shrub tundra.

Parent material: Itkillik I glacial till.

Sampled by: D.A. Walker and C. Westberg, August 13, 1989.

Remarks: Plot is on interscar element of a frost-scar complex. Plot SWT-35 is on the scar element. Estimate 15 percent of surface covered by frost scars. Ground is frozen at 40 cm.

Weather: cloudy, rainy, cold.

Colors are for the moist soil.

- Oi 0 - 3 cm. Mat of mosses and lichen bases; abrupt wavy boundary.
- Oe 3 - 9 cm. Primarily very dark brown (7.5YR 2/2) loose mat of fine roots, dead lichens and sedge leaves; after rubbing est. 20 percent recognizable plant fibers; abrupt wavy boundary.
- Oa 9 - 18 cm. Dark brown (10YR 3/3) loamy organic material; inclusions of very dark brown (10YR 2/2) hemic organic material; weak medium subangular blocky, breaking to a moderate fine granular structure; friable (moist), smooth, slightly sticky, slightly plastic (wet); pH = 4.1; many fine and very fine roots; abrupt, wavy boundary. (Sample T-072).
- Bw 18 - 40+ cm. Brown (10YR 4/3) clay with many medium distinct dark yellowish brown (10YR 4/6) mottles; massive structure; firm (moist), gritty, sticky, plastic (wet); few fine roots. (Sample T-073).

Plot SWT-34 Soil Description

Classification: Pergelic Cryosaprist, euic.

Location: Northwest side of Toolik Lake. 68°38' N, 149°38' W.

Physiographic position: Flat lake margin.

Topography: Solifluction features.

Microrelief height: 50 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Carex podocarpa*, *Salix reticulata*, *Aconitum delphinifolium* sedge, forb tundra.

Parent material: Itkillik II glacial outwash.

Sampled by: D.A. Walker and C. Westberg, August 8, 1989.

Remarks: Water at 38 cm.

Weather: mostly sunny, windy.

Colors are for moist soil, except where noted.

- Oi 0 - 3 cm. Loose mat of mosses, litter and sedge leaves (*Tomentypnum nitens*, *Rhytidum rugosum*); smooth, abrupt boundary.
- Oe 3 - 15 cm. Very dark brown (7.5YR 2/1.5) loose organic material, est. 2 percent silt; moist to wet; pH = 6.9; many fine, very fine and few medium roots; smooth, clear boundary. (Sample T-076).
- Oa 15 - 63 cm. Very dark brown (7.5YR 2/1.5) sapric organic material with est. < 2 percent sandy loam; weak, medium, platy structure due to compressed organics; wet; pH = 6.2; many fine live roots; water table at 38 cm. (Sample T -077).

Plot SWT-35 Soil Description

Classification: Pergelic Cryaquept, fine-loamy, mixed, acid.

Location: South of Toolik Lake, on hill in tussock tundra, along transect across water track, adjacent to Plot SWT-32. 68°38' N, 149°38' W.

Physiographic position: Sideslope of 5 percent N-facing slope.

Topography: Frost scar element in tussock tundra. Diameter of frost scar is about 1 m.

Microrelief height: 5 cm.

Drainage: Well drained.

Vegetation: Dry *Luzula arctica*, *Juncus biglumis* barren.

Parent material: Itkillik I glacial till.

Sampled by: D.A. Walker and C. Westberg, August 13, 1989.

Remarks: Frost scar element of frost-scar complex. Plot SWT-32 is the inter-scar element.

Ground frozen at 75 cm.

Weather: cold, rainy.

Colors are for the moist soil.

- Bw1 0 - 6 cm. Dark yellowish brown (10YR 4/6) sandy clay loam; moderate, fine, granular structure; oxidized surface layer; firm (moist), gritty, sticky, plastic (wet); pH = 4.7; est. 2 percent fine gravel < 1 cm diameter; irregular boundary. (Sample T-078).
- B2 6 - 40+ cm. Predominantly grey (7.5YR 5.5/1) sandy clay loam with many large strong brown (7.5YR 5/8) mottles; moderate medium platy breaking to moderate, fine, granular structure; firm (moist), gritty, sticky, plastic (wet); est. 2 percent fine gravel < 1 cm diameter; few very fine roots to 40 cm.

Plot SWT-37 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: Northwest side of Toolik Lake, between S-7 and Toolik Lake, in marsh, surrounding small lake. Base of toposequence SWT-37 to SWT-47. 68°38' N, 149°38' W.

Physiographic position: Colluvial basin (marsh along small lake margin).

Topography: Strangmoor and aligned hummocks. Interhummock element.

Microrelief height: 15 cm.

Drainage: Very poorly drained.

Vegetation: Wet *Carex chordorrhiza*, *Carex aquatilis*, *Scorpidium scorpioides* sedge tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 8, 1989.

Remarks: Water at surface. Thaw depth is > 1 m.

Weather: Clear, breezy.

Colors are for the wet soil.

Oi1 0 - 2 cm. Dead sedge leaves and marl; abrupt, smooth boundary.

Oi2 2 - 32 cm. Dark brown after rubbing (7.5YR 3/2) fibric material with est. < 2 percent fine sand and silt; tight mat of sedge roots; saturated; pH = 5.6; abrupt smooth boundary. (Sample T-083).

Oa 32 - 40+ cm. Very dark gray (7.5YR 3.5/1) gravelly loamy sapric material; saturated; gritty, slightly sticky, slightly plastic (wet); pH = 6.1; est. 20 percent fine gravel to 3 cm diameter. (Sample T-084).

Plot SWT-38 Soil Description

Classification: Histic Pergelic Cryaquoll, fine-loamy, mixed.

Location: Northwest side of Toolik Lake. Close to plot SWT-37, on strang. Part of toposequence SWT-37 - SWT-47. 68°38' N, 149°38' W.

Physiographic position: Colluvial basin, on fen margin.

Topography: Aligned hummock in flat fen.

Microrelief height: 10 - 15 cm.

Drainage: Poorly drained.

Vegetation: Moist *Carex aquatilis*, *Dryas integrifolia*, *Tomentypnum nitens* sedge, dwarf-shrub tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 8, 1989.

Remarks: Ground frozen at 78 cm.

Weather: Clear, breezy.

Colors are for the wet soil.

- Oi 0 - 3 cm. Loose mat of live mosses, moss bases, dead sedge leaves; pH = 7.0; abrupt smooth boundary. (Sample T-085).
- Oa 3 - 8 cm. Very dark brown after rubbing (7.5YR 2/1.5) sapric material with est. < 1 percent by volume silt; after rubbing < 1 percent recognizable plant material; loose structure; moist to wet; smooth, nonsticky, slightly plastic (wet); pH = 7.5; many fine and very fine roots, < 1 percent recognizable plant material after rubbing; abrupt smooth boundary. (Sample T-086).
- II0e1 8 - 19 cm. Very dark brown after rubbing (7.5YR 2/3) hemic material with est. < 2 percent by volume loamy sand; after rubbing 50 percent recognizable plant fibers; weak, medium, platy structure, due to compressed organics; wet; many fine and very fine roots; clear smooth boundary. (Sample T-087).
- II0e2 19 - 24 cm. Very dark brown (10YR 2/2.5) hemic material with est. 5 percent by volume loam; weak, medium, platy structure due to compressed organics; wet; gritty, slightly sticky, plastic (wet); many very fine roots; abrupt smooth boundary.
- Bg 24 - 53 cm. Very dark grey (10YR 3.5/1) organic rich gravelly sandy clay loam; massive structure; wet; gritty, plastic, sticky (wet); pH = 5.7; est. 15 percent fine gravel < 2 cm diameter; clay increases at 50 cm depth; common very fine roots; water table at 27 cm. (Sample T-088).

Plot SWT-39 Soil Description

Classification: Pergelic Cryaquoll, fine-loamy, mixed.

Location: Northwest side of Toolik Lake. South-facing slope on toposequence upslope from little lake between S-7 and Toolik. 68°38' N, 149°38' W.

Physiographic position: Lower backslope on long SSE-facing gentle (10 percent) hillslope.

Topography: Numerous non-sorted stripes, soil is described from area between stripes; solifluction lobes to 20-25 cm height; small flarks between lobes.

Microrelief height: 10 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Carex bigelowii*, *Dryas integrifolia*, *Salix reticulata*, *Tomentypnum nitens* sedge, dwarf-shrub tundra.

Parent material: Retransported Ikillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 8, 1989.

Remarks: Soil frozen at 65 cm depth. Water dripping into pit at base of organic layer (15 cm depth).

Weather: Warm, partly cloudy, windy.

Colors are for the wet soil.

- Oi** 0 - 4 cm. Loose mat of *Hylocomium splendens*, *Aulacomnium palustre* and dead sedge leaves; pH = 6.8; smooth clear boundary. (Sample T-089).
- Oa** 4 - 15 cm. Very dark brown (7.5YR 2/1.5) sapric material with est. 5 percent by volume fine sandy loam, that increases toward the base of the horizon; wet; pH = 6.7; smooth abrupt boundary. (Sample T-090).
- Bh** 15 - 51 cm. Very dark grayish brown (10YR 3/2) organic rich loam; est. 15 percent organic material by volume; common medium brown (10YR 4/6) mottles to 2 - 3 cm diameter, and occasional olive (5Y 5/4) mottles; medium, moderate, subangular blocky structure; wet; slightly gritty, plastic, sticky (wet); pH = 6.1; est. 10 percent fine gravel to 2 cm diameter; smooth clear boundary. (Sample T-091).
- IIBg** 51 - 65+ cm. Dark gray (10YR 4.5/1) gravelly clay; common medium brown (10YR 4/6) mottles; massive structure; wet; very sticky, very plastic (wet); est. 15 percent fine gravel to 3 cm diameter.

Plot SWT-40 Soil Description

Classification: Pergelic Cryaquoll, fine-loamy, mixed.

Location: Northwest side of Toolik Lake. Toposequence upslope from small lake between pond S-7 and Toolik Lake.

Physiographic position: Sideslope of 10 percent SSE-facing slope.

Topography: Nonsorted stone stripes with frost scars.

Microrelief height: 15 cm.

Drainage: Moderately well drained.

Vegetation: Dry *Vaccinium uliginosum*, *Salix reticulata*, *Tomentypnum nitens*, *Equisetum arvense*, *Astragalus umbellatus*, *Cetraria cucullata* dwarf-shrub, horsetail, fruticose-lichen tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 9, 1989.

Remarks: Ground unfrozen to 100 cm.

Weather: Cloudy, windy.

Colors are for the moist soil.

- Oi 0 - 3 cm. Mat of *Polytrichum juniperinum*, *Dicranum* spp. and lichens; smooth clear boundary.
- Oe 3 - 8 cm. Very dark brown (7.5YR 2/2) organic silt; medium fine granular structure; moist; smooth clear boundary.
- Oa 8 - 13 cm. Black (7.5YR 2/1) loamy sand; weak, medium subangular blocky, breaking to a weak medium granular structure; wet; smooth, slightly sticky, slightly plastic (wet); pH = 5.3; abrupt wavy boundary. (Sample T-092).
- B1 13 - 18 cm. Dark brown (10YR 3/3) sandy clay loam; moderate medium subangular blocky, breaking to moderate medium granular structure; wet; slightly gritty, plastic, sticky (wet); pH = 6.2; est. 10 percent gravel to about 3 cm; indistinct boundary. (Sample T-093).
- B2 18 - 44+ cm. Brown (10YR 4/3) gravelly clay; massive structure; wet; gritty, sticky, plastic (wet); est. 20 percent gravel.

Plot SWT-41 Soil Description

Classification: Pergelic Cryosaprist, euic.

Location: Northwest side of Toolik Lake. South-facing slope on toposequence upslope from little lake between S-7 and Toolik. 68°38' N, 149°36' W.

Physiographic position: Midslope on lower part of non sorted stripe complex. Backslope of 10 percent SSE-facing hill.

Topography: Interstripe area of non sorted stone stripe complex. Hummocks to 20 cm height. with frost scars (lower part of stonestripe complex).

Microrelief height: 20 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Carex bigelowii*, *Salix reticulata*, *Tomentypnum nitens*, *Equisetum arvense* sedge, horsetail, dwarf-shrub tundra.

Parent material: Retransported Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 9, 1989.

Remarks: Soil frozen at 53 cm. Interstripe areas are elevated above stripes, possibly due to build up of organic material. Stripe adjacent to this site has 10 cm of organic material; whereas, this site has 53 cm. Thaw depth on stripe is > 100 cm; thaw in interstripe areas is ~ 50 cm. Considerable evidence of cryoturbation in Oa/A horizon.

Weather: Cloudy, cool.

Colors are for the wet soil.

- Oi 0 - 3 cm. Mat of *Tomentypnum nitens*, *Ditrichum flexicaule*, *Ptilidium ciliare*; wavy abrupt boundary.
- Oa1 3 -7 cm. Very dark brown (7.5YR 2/1.5) sapric material with est. 10 percent by volume loamy fine sand; loose structure; moist to wet; slightly sticky, slightly plastic, smooth (wet); pH = 7.2; wavy clear boundary.
(Sample T-094).
- Oa2 7 - 53+ cm. Very dark brown (7.5YR 2/2) sandy loam, mixed with sapric material; weak, medium, platy structure due to compressed organics; wet; smooth, slightly sticky, slightly plastic (wet); pH = 6.9; areas of more mineral-rich material and pockets of loose organic material, that have been stirred into the horizon; occasional live roots at 50 cm depth; est. 10 percent fine gravel to 2 cm diameter. (Sample T-095).

Plot SWT-44 Soil Description

Classification: Pergelic Cryaquoll, loamy-skeletal, mixed.

Location: Northwest side of Toolik Lake. 68°38' N, 149°38' W. Part of southfacing toposequence.

Physiographic position: Shoulder of long gentle (12 percent slope) SSE-facing toposequence.

Topography: Stripe element of sorted stone stripe complex.

Microrelief height: 5 cm.

Drainage: Moderately well drained.

Vegetation: Dry *Dryas integrifolia*, *Cassiope tetragona*, *Oxytropis maydelliana*, *Cetraria cucullata* dwarf-shrub, fruticose-lichen tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 9, 1989.

Remarks: Active layer is > 100 cm. Water table at 37 cm. This plot represents the stripe element of a sorted stripe complex.

Weather: Cool, cloudy.

Colors are for the moist soil, except where noted.

Oi 0 - 2 cm. Mat of mosses, dead *Dryas integrifolia* and *Rhytidium rugosum*.

Oa 2 - 17 cm. Very dark brown (7.5YR 2/1.5) sapric material mixed with gravelly sandy loam; weak, medium, subangular blocky, breaking to a fine, weak, granular structure; moist; pH = 5.9; friable (moist), smooth, slightly sticky, slightly plastic (wet); est. 45 percent by volume gravel to 15 cm diameter; common very fine and fine roots; wavy abrupt boundary. (Sample T-104).

Bw 17 - 53 cm. Dark greyish brown (10YR 3.5/2, wet) very gravelly sandy clay loam; few small strong brown (7.5YR 3/6) mottles; moderate, medium, subangular blocky, breaking to a moderate medium granular structure; moist to wet; gritty, sticky, plastic (wet); pH = 6.8; est. 45 percent by volume gravel to 15 cm diameter; few fine roots penetrate to 30 cm; water table at 37 cm. (Sample T-105).

Plot SWT-45 Soil Description

Classification: Histic Pergelic Cryaquoll, loamy-skeletal, mixed.

Location: Northwest side of Toolik Lake, part of south-facing toposequence. Interstripe plot, matched with SWT-44 - stripe plot. 68°37' N, 149°38' W.

Physiographic position: Shoulder of long gentle (12 percent slope) SSE-facing toposequence on upper part of sorted stripe complex.

Topography: Interstripe element of sorted stone-stripe complex. Hummocks to 10 cm tall.

Drainage: Moderately well drained.

Vegetation: Moist *Equisetum arvense*, *Carex bigelowii*, *Salix reticulata*, *Dryas integrifolia*, *Tomentypnum nitens* horsetail, sedge, dwarf-shrub tundra.

Parent material: ItkilliK II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 9, 1989.

Remarks: Soil frozen at 80 cm. Water table at 53 cm. Interstripe element of sorted stripe complex. Plot SWT-44 is the stripe element.

Weather: Cool, cloudy.

Colors are for the moist soil.

- Oi 0 - 8 cm. Mat of alive and dead *Tomentypnum nitens*, sedge leaves, *Cassiope tetragona* and *Dryas integrifolia*; pH = 6.2; smooth abrupt boundary. (Sample T-106).
- Oa1 8 - 22 cm. Black (7.5YR 2/1) sandy loam; weak medium subangular blocky, breaking to a weak fine granular structure; wet; friable (moist), smooth, nonsticky, nonplastic (wet); pH = 6.1; many fine and very fine roots; clear smooth boundary. (Sample T-107).
- Oa2 22 - 35 cm. Dark brown (7.5YR 3/2) loam; wet; weak medium sub angular blocky, breaking to a moderate fine granular structure; wet; friable (moist), smooth, slightly sticky, slightly plastic (wet); pH = 6.4; most roots are above 31 cm; irregular abrupt boundary. (Sample T-108).
- A/B Dark brown (10YR 4/3) gravelly sandy clay loam with many fine yellowish brown (10YR 5/6) mottles and traces of very dark brown (7.5YR 2/2) organic matter, that appear to have been stirred into horizon from above; massive structure; wet; firm (moist), gritty, sticky, plastic (wet); pH = 6.8; few fine roots to base of B; est. 15 percent of gravel less than 2 cm diameter; indistinct boundary. (Sample T-109).
- Bw 60 - 65+ cm. Grayish brown (10YR 4.5/2) gravelly loam; massive structure; wet; firm (moist), gritty, plastic, sticky (wet); pH = 7.5. (Sample T-110).

Plot SWT-47 Soil Description

Classification: Pergelic Cryoboroll, loamy-skeletal, mixed.

Location: Northwest side of Toolik Lake. Top of hill above S-5. 68°38' N, 149°38' W.

Physiographic position: Hill crest.

Topography: Featureless ground.

Microrelief height: 10 - 15 cm.

Drainage: Somewhat excessively drained.

Vegetation: Dry *Dryas octopetala*, *Arnica alpina*, *Hierochloë alpina*, *Calamagrostis purpurascens*,
Oxytropis sp. dwarf-shrub, crustose-lichen tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 10, 1989.

Remarks:

Weather: Hazy overcast, very windy weather.

Colors are for the moist soil.

Oi 0 - 1 cm. Dead *Dryas* sp. leaves and miscellaneous litter.

Oa 1 - 5 cm. Very dark brown (7.5YR 2/2) sandy clay loam; weak fine granular structure; dry; friable (moist), smooth, slightly sticky, slightly plastic (wet); pH = 5.0; many fine and very fine roots; est. 10 percent of fine gravel less than 2 cm diameter; abrupt smooth boundary. (Sample T-113).

A 5 - 23 cm. Dark brown (10YR 3.5/3) gravelly sandy loam; weak medium subangular blocky, breaking to a weak granular structure; damp; friable (moist), gritty, slightly sticky, slightly plastic (wet); pH = 4.9; common very fine and occasionally fine roots; est. 35 percent gravel with cobbles up to 20 cm diameter; clear wavy boundary., (Sample T-114).

IIB 23 -65 cm. Dark grayish brown (10YR 4/2) gravelly sandy clay loam; moderate medium subangular blocky, breaking to a fine moderate granular structure; damp; friable (moist), gritty, sticky, plastic (wet); pH = 7.3; est. 35 percent gravel with cobbles up to 20 cm diameter. (Sample T-115).

Plot SWT-48 Soil Description

Classification: Pergelic Cryoboroll, fine-loamy, mixed.

Location: Northwest side of Toolik Lake, directly above bay with creek from pond S-7 running into it. 68°38' N, 149°38' W.

Physiographic position: Hillcrest.

Topography: Disturbed by animal activity (bird and squirrel mounds).

Microrelief height: 30 cm.

Drainage: Well drained.

Vegetation: Moist *Poa glauca*, *Bromus pumpellianus*, *Ranunculus pedatifidus* grass, forb tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 9, 1989.

Remarks: Many ground squirrel tunnels and dens. Shrub height: 50 cm.

Weather: Cloudy, windy.

- Oi 0-2 cm. Mat of moss (*Thuidium abietinum*) and dead grass litter.
- Oa 2 - 16 cm. Very dark brown (10YR 2.5/3) in dry condition or very dark brown (7.5YR 2/2.5) when wet sandy loam; weak medium subangular blocky, breaking to a very fine weak granular structure; dry; slightly gritty, slightly plastic, slightly sticky (wet); pH = 6.4; many fine and common fine roots; est. 10 percent fine gravel less than 2 cm diameter; gradual, wavy boundary. (Sample T-116).
- B 16 - 45+ cm. Yellowish brown (10YR 5/5, dry) or dark yellowish brown (10YR 3/4, wet) sandy loam; weak medium subangular blocky, breaking to a very fine weak granular structure; dry; gritty, slightly sticky, slightly plastic (wet); pH = 6.6; est. 20 percent of gravel and cobbles; carbonate stage 1 on underside of larger cobbles; areas of crotovinas have brown (10YR 4/3) dry color or dark brown (10YR 3/3) wet color; many very fine roots to 40 cm. (Sample T-117).

Plot SWT-49 Soil Description

Classification: Pergelic Cryoboroll, loamy-skeletal, mixed.

Location: Northwest side of Toolik Lake. North slope of hill. Part of toposequence between plot SWT-47 and S8. 68°38' N, 149°38' W.

Physiographic position: Upper backslope of north-facing 50 percent slope.

Topography: Slope angle 30°. Hummocky terrain with some solifluction features.

Microrelief height: 10 cm.

Drainage: Well drained.

Vegetation: Dry *Cassiope tetragona*, *Carex microchaeta*, *Cladonia arbuscula* dwarf- shrub, fruticose-lichen tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 10, 1989.

Remarks: Upper portion of well-drained snowbed with numerous ground squirrel dens. Active layer is > 50 cm.

Weather: clear.

Colors are for the damp soil.

- Oi 0 - 4 cm. Mat of *Dicranum* sp., *Cladonia arbuscula*, *C. rangijerina* and dead *Cassiope tetragona* branches.
- Oa 4 - 14 cm. Very dark brown (7.5YR 2/2.5) sandy loam; weak medium subangular blocky, breaking to a weak fine granular structure; damp; friable (moist), smooth, slightly sticky, slightly plastic (wet); pH = 4.0; many fine and very fine roots; abrupt wavy boundary. (Sample T-118).
- AB 14 - 30 cm. Dark brown (10YR 3.5/3) very gravelly sandy loam; very weak subangular blocky, breaking to a moderate fine granular structure; damp; friable (moist), gritty, nonplastic, nonsticky (wet); pH = 5.3; common fine roots; est. 60 percent gravel, cobbles and stones to 20-cm diameter; gradual indistinct boundary. (Sample T-119).
- C 30 - 50+ cm. Dark grayish brown (10YR 4/2) very gravelly sandy loam; single grain structure; damp; friable (moist), gritty (wet); pH = 7.6; no roots; est. 60 percent gravel. (Sample T -120).

Plot SWT-51 Soil Description

Classification: Pergelic Cryaquoll, loamy-skeletal, mixed.

Location: Northwest side of Toolok Lake. North slope of hill, directly above and to the north of lake S-5. Part of toposequence SWT-47 to 58. 68°38' N, 149°38' W.

Physiographic position: Lower backslope of N-facing 20 percent slope.

Topography: Solifluction features.

Microrelief height: to 30 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Salix rotundifolia*, *Hylocomium splendens* dwarf-shrub, moss tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 10, 1989.

Remarks: Lower part of snowbed. Ground frozen at 53 cm. Water is seeping out of wall of soil pit at 18 cm depth (base of Oa).

Weather: partly cloudy, warm, windy.

Colors are for the wet soil.

- Oi 0 - 4 cm. Mat of live and dead *Hylocomium splendens* and *Salix rotundifolia* litter; smooth abrupt boundary.
- Oe 4 - 9 cm. Black (7.5YR 2/1) hemic material; loose structure; wet; pH = 6.4; very many very fine and common fine roots; smooth clear boundary. (Sample T-124).
- Oa 9 - 24 cm. Very dark brown (10YR 2/2) silt loam; weak medium subangular blocky, breaking to a weak fine granular structure; at the base of horizon there is a band of dark yellowish brown (10YR 4/5) mottles; wet; smooth, slightly sticky, slightly plastic (wet); pH = 6.7; roots penetrate to about 18 cm; abrupt wavy boundary. (Sample T-125).
- IIBw 24 - 45 cm. Brown (10YR 4/3) very gravelly sandy clay loam; moderate medium subangular blocky structure; wet; gritty, sticky, plastic (wet); pH = 7.3; est. 40 percent gravel to 3 - 4 cm diameter; clear irregular boundary. (Sample T-126).
- IIC 45 - 53+ cm. Brown (10YR 4/3) to dark grayish brown (10YR 4/2) very gravelly sandy loam; single grain structure; very wet; gritty, nonsticky, nonplastic (wet); pH = 7.9; est. 50 percent gravel to 3 cm diameter. (Sample T-127).

Plot SWT-53 Soil Description

Classification: Histic Pergelic Cryaquoll, fine-loamy, mixed.

Location: Northwest side of Toolik Lake, out of sight of the lake, at base of the north-facing toposequence between SWT-47 and SWT-58. 68°38' N, 149°38' W.

Physiographic position: Toeslope of 8 percent N-facing slope.

Topography: Hummocky area with solifluction features.

Microrelief height: 20 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Carex bigelowii*, *Dryas integrifolia*, *Hylocomium splendens*, *Salix planifolia* ssp. *pulchra* sedge, dwarf-shrub tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 10, 1989.

Remarks: Ground frozen at 40 cm. Pit saturated at 21 cm. Slight evidence of grazing. Moderate animal disturbance, mostly voles (tracks, holes etc.).

Weather: overcast, light wind.

Colors are for the wet soil.

- Oi 0 - 7 cm. Loose mat of *Hylocomium splendens*, *Dicranum scoparium*, *Cassiope tetragona* and litter; inorganic part of soil - sandy loam; pH = 5.8. (Sample T-132).
- Oe 7 - 12 cm. Loose mat of hemic organic material; weak medium platy structure (due to compressed organics); 30 percent recognizable plant fiber after rubbing; pH = 6.1; clear, smooth boundary. (Sample T-133).
- Oa 12 - 17 cm. Very dark brown (7.5YR 2/1.5) silty organic material, with strong brown (7.5YR 4/6) mottles at base of horizon; weak moderate platy, breaking to a weak fine granular structure; wet; smooth, slightly plastic, slightly sticky (wet); pH = 6.0; abrupt wavy boundary. (Samples T-134, T135).
- A 17 - 40+ cm. Very dark brown (10YR 2/3) gravelly sandy loam; moderate medium subangular blocky structure; very wet; gritty, plastic, sticky (wet); pH = 5.3; est. 15 percent gravel to 3 cm diameter. (Sample T-136).

Plot SWT-54 Soil Description

Classification: Histic Pergelic Cryaquoll, fine-loamy, mixed.

Location: Northwest side of Toolik lake, at base of steep north slope toposequence, between SWT-47 and SWT-58. 68°38' N, 149°38' W.

Physiographic position: Lower footslope of 6 percent SSW-facing slope.

Topography: Hummocky terrain, including turf hummocks and some solifluction features.

Microrelief height: 30 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Eriophorum vaginatum*, *Salix planifolia* ssp. *pulchra*, *Hylocomium splendens*, *Sphagnum rubellum* tussock-sedge, dwarf-shrub tundra.

Parent material: Itkillik II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 10, 1989.

Remarks: Ground frozen at 44 cm. Soil saturated below 11 cm. Minor animal disturbance.

Weather: raining.

Colors are for the wet soil.

- Oi 0 - 8 cm. Loose moss, moss bases, tussock bases and roots; pH = 4.3; wavy clear boundary. (Sample T-137).
- Oe 8 - 15 cm. Black (7.5YR 2/1) loose hemic material; est. 20 percent recognizable plant fibers after rubbing (beneath tussocks); weak moderate platy structure; pH = 6.2; coarse roots of *Eriophorum vaginatum* make up to 75 percent of horizon's volume; clear smooth boundary. (Sample T-138).
- Oa 15 - 21 cm. Very dark brown (7.5YR 2/3) sandy loam; dark yellowish brown (10YR 4/6) medium mottles form discontinuous band at base of Oa; weak moderate platy structure; wet; pH = 5.4; est. 20 percent recognizable plant fibers after rubbing (sedge leaves and roots); abrupt smooth boundary. (Sample T -139).
- Bw 21 - 39 cm. Dark brown (10YR 3.5/3) gravelly sandy clay loam; massive structure; very wet; gritty, sticky, plastic (wet); pH = 5.6; est. 15 percent fine gravel up to 2-cm diameter; gradual wavy boundary. (Sample T-140).
- Cg 39 - 44+ cm. Dark gray (10YR 4/1) gravelly sandy clay loam; massive structure; very wet; gritty, very sticky, very plastic (wet); pH = 5.0; est. 15 percent fine gravel less than 2 cm diameter. (Sample T-I41).

Plot SWT-56 Soil Description

Classification: Pergelic Cryosaprist, euic.

Location: Northwest side of Toolik Lake. Floodplain at the bottom of north-facing toposequence.

68°38' N, 149°38' W.

Physiographic position: Middle part of stabilized floodplain.

Topography: Flat centered polygon. Trough-center elevation: 90 cm.

Microrelief height: 10 cm hummocks.

Drainage: Poorly drained.

Vegetation: Moist *Carex bigelowii*, *Eriophorum triste*, *Dryas integrifolia*, *Cetraria cucullata* sedge, dwarf-shrub tundra.

Parent material: Alluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 11, 1989.

Remarks: Ground frozen at 38 cm. Soil saturated below 14 cm. Minor animal disturbance (signs of caribou, vole and ptarmigan activity).

Weather: Cloudy.

Colors are for the wet soil.

- Oi 0 - 3 cm. Mat of *Racomitrium lanuginosum*, *Dryas integrifolia*, dead sedge leaves, moss bases etc.; smooth abrupt boundary.
- Oe 3 - 8 cm. Black (7.5YR 2/1) loose organics; est. 10 percent recognizable plant fibers after rubbing; weak medium platy structure; wet; smooth clear boundary.
- Oa 8 - 21 cm. Very dark brown (7.5YR 2/2) hemic material; est. 15 percent recognizable plant fibers after rubbing, tightly bound with roots; weak medium platy structure; wet; pH = 5.4; abrupt wavy boundary. (Sample T-143).
- B/O 21 - 34 cm. Very dark grayish brown (10YR 3/2) loam; moderate medium subangular blocky structure; very wet; smooth, slightly sticky, slightly plastic (wet); pH = 6.1; est. 5 percent recognizable plant fibers after rubbing. (Sample T-144).

Plot SWT-57 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: Northwest side of Toolik Lake, in wetland at bottom of the north-facing toposequence.

Stake is in the water. 68°38' N, 149°38' W.

Physiographic position: Small colluvial basin.

Topography: Strangmoor and aligned hummocks in fen. Plot is in the interhummock element of the fen.

Microrelief height: 15 cm.

Drainage: Very poorly drained.

Vegetation: Wet *Carex chordorrhiza*, *Carex rotundifolia*, *Carex aquatilis*, *Scorpidium scorpioides* sedge tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 11, 1989.

Remarks: Ground frozen at 56 cm. Water table at 10 cm. Very complex microtopography in wetland. Inter-hummock element of strangmoor complex. Paired with Plot SWT-58.

Weather: mostly cloudy.

Colors are for the saturated soil.

Oi Black (7.5YR 1.7/1) mat of sedge bases and root fibers; abrupt smooth boundary.

Oe 2 - 36 cm. Very dark brown (7.5YR 2/3) very tight mat of peat, composed of very fine roots; est. 25 percent recognizable plant fibers after rubbing; pH = 5.6; saturated; abrupt smooth boundary. (Sample T-145).

Cg 36+ cm. Dark gray (10YR 4/1) clay; saturated; smooth, sticky, plastic (wet); pH = 5.2. (Sample T-146).

Plot SWT-58 Soil Description

Classification: Pergelic Cryohemist, euic.

Location: Northwest side of Toolik Lake. Wetland at the end of toposequence, that begins on hill to the North of S-5, associated with SWT-57. 68°38' N, 149°38' W.

Physiographic position: Small colluvial basin.

Topography: Strangmoor and aligned hummocks in fen.

Drainage: Poorly drained.

Vegetation: Moist *Carex aquatilis*, *Carex rariflora*, *Salix fuscescens* sedge, dwarf-shrub tundra.

Parent material: Colluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 11, 1989.

Remarks: Hummock element of strangmoor complex. Paired with Plot SWT-57. Ground frozen at 70 cm. Water table at 10 cm.

Weather: Mostly cloudy, light rain.

Colors are for the wet soil, unless otherwise indicated.

- Oi 0 - 3 cm. Loose mat of mosses and lichens - mainly *Cetraria cucullata*, *Aulacomnium turgidum*, *Rhytidium rugosum*, *Dicranum* sp.; abrupt smooth boundary.
- Oa 3 - 8 cm. Black (5YR 2/1) sapric organic material (moist color); weak fine granular structure; moist; smooth (wet); pH= 6.6; smooth abrupt boundary. (Sample T-147).
- Oel 8 - 24 cm. Very dark brown (7.5YR 2/2.5) hemic material, tightly bound by very fine roots; est. 30 percent recognizable plant fibers after rubbing; wet; pH = 6.6; clear irregular boundary. (Sample T-148).
- Oe2 24 - 37 cm. Very dark grayish brown (10YR 3/2) loose hemic material, composed of mostly sedge leaves; very wet; pH = 6.0; clear irregular boundary.
- Cg 37 - 45+ cm. Gray (N 4/0) clay; massive structure; saturated; smooth, very sticky, very plastic (wet); pH = 5.2. (Sample T-149).

Plot SWT-61 Soil Description

Classification: Pergelic Cryoboroll, fine-loamy, mixed.

Location: North side of Toolik Lake, near Limno Bay, in willow patch. 68°38' N, 149°36' W.

Physiographic position: Midslope, 40 percent south-facing slope.

Topography: Featureless ground.

Microrelief height - 25 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Salix glauca*, *Betula nana*, *Festuca altaica* low-shrub tundra.

Parent material: Itkillik: II glacial till.

Sampled by: D.A. Walker and C. Westberg, August 14, 1989.

Remarks: 1-m shrubs. Rocky terrain, probably deep active layer.

Weather: Raining.

Colors are for the moist soil.

- Oi 0 - 2 cm. Layer of moss *Rhytidium rugosum* and litter; smooth abrupt boundary.
- Oa 2 - 8 cm. Very dark brown (7.5YR 2/3) organic silty loam; weak fine granular structure; smooth, nonsticky, nonplastic (wet); wavy clear boundary.
- Oa2 8 - 16 cm. Very dark brown (7.5YR 2/2) sandy loam; weak medium subangular blocky, breaking to a weak fine granular structure; smooth, slightly sticky, slightly plastic (wet); pH = 6.4; many fine roots; abrupt smooth boundary. (Sample T-152).
- A2 16 - 40+ cm. Dark brown (10YR 3/3) gravelly sandy loam; weak medium subangular blocky, breaking to a weak fine granular structure; gritty, slightly sticky, slightly plastic (wet); pH = 7.1; est. 20 percent fine gravel less than 2 cm diameter. (Sample T-153).

Plot SWT-65 Soil Description

Classification: Pergelic Cryumbrept, loamy-skeletal, mixed.

Location: North side of Toolik Lake. To the west of outlet stream, above floodplain. 68°38' N, 149°36' W.

Physiographic position: Glaciofluvial outwash.

Topography: Featureless ground.

Microrelief height: 5 cm.

Drainage: Well drained.

Vegetation: Dry *Vaccinium vitis-idaea*, *Hierochloë alpina*, *Cladonia arbuscula* dwarf-shrub, fruticose-lichen tundra.

Parent material: Itkillik II glaciofluvial outwash.

Sampled by: D.A. Walker and C. Westberg, August 12, 1989.

Remarks: Deep active layer in rocky soils.

Weather: Mostly clear, very windy.

Colors are for the damp soil.

- Oi 0 - 1 cm. Mat of lichens and mosses, mostly *Polytrichum juniperinum* and *Cladonia* spp.
- Oa 1 - 4 cm. Very dark brown (7.5YR 2/2) organic clay loam; weak fine granular structure; damp; pH = 3.7; abrupt smooth boundary. (Sample T-158).
- A 4 - 7 cm. Thin discontinuous layer of brown (7.5YR 5.5/3) clay loam; weak medium subangular blocky, breaking to a weak fine granular structure; damp; smooth, sticky, plastic (wet); pH = 3.7; abrupt smooth boundary.
- Bw1 7 - 18 cm. Mixed dark brown (7.5YR 3/4) with strong brown (7.4YR 4/7) and very dark brown (7.5YR 2/3) very gravelly clay loam; weak medium subangular blocky, breaking to a weak fine granular structure; damp; friable (moist), gritty, slightly sticky, slightly plastic (wet); pH = 4.3; common very fine roots to 25 cm depth with silt caps to 4 mm; est. 70 percent gravel and small cobbles; gradual wavy boundary. (Sample T-159).
- Bw2 18 - 35+ cm. Dark brown (10YR 3/3) very gravelly sandy loam; very weak moderate subangular blocky structure; damp; friable (moist), gritty, nonplastic, nonsticky (wet); pH = 4.8; dark manganese stains on bottom of rocks. (Sample T-160).

Plot SWT-68 Soil Description

Classification: Lithic Pergelic Cryosaprist, euic.

Location: North side of Toolik Lake, east of outlet stream, west of runway in *Salix* community along river. 68°38' N, 149°36' W.

Physiographic position: Stabilized floodplain.

Topography: Irregular relief associated with stream drainage.

Microrelief height: 30 - 60 cm.

Drainage: Somewhat poorly drained.

Vegetation: Moist *Salix planifolia* ssp. *pulchra*, *Salix lanata*, *Calamagrostis canadensis*, *Potentilla fruticosa*, *Rubus arcticus* low shrubland.

Parent material: Alluvial deposit.

Sampled by: D.A. Walker and C. Westberg, August 12, 1989.

Remarks: Shrub height: 1.5 - 2.0 m. Rock cover > 5 percent. Soil lies directly on large cobbles of river bed at 27 cm depth.

Weather: Cloudy.

Colors are for the wet soil.

- Oi 0 - 4 cm. Mat of *Calamagrostis canadensis* with mosses; abrupt smooth boundary.
- Oe 4 - 10 cm. Very dark brown (7.5YR 2/2) loose mat, composed of grass roots, leaves, hemic material; est. 50 percent recognizable plant fibers after rubbing; many fine rhizomes and very fine roots; abrupt smooth boundary.
- Oal 10 - 18 cm. Very dark brown (7.5YR 2/2) organic loam; est. less than 2 percent recognizable plant fibers after rubbing; weak medium subangular blocky, breaking to a weak fine granular structure, tightly bound with fine grass roots; wet; smooth, slightly sticky, slightly plastic (wet); pH = 6.9. (Sample T-164).
- Oa2 18 - 27 cm. Very dark grayish brown (10YR 3/2) loam, with many medium yellowish brown (10YR 5/6) and yellowish red (5YR 4/8) mottles; weak subangular blocky structure, bound by many fine roots; wet; smooth, sticky, plastic (wet); pH = 4.8; roots extend all the way to the bottom of horizon. (Sample T-165).

Plot SWT-70 Soil Description

Classification: Pergelic Cryochrept, sandy-skeletal, mixed.

Location: North side of Toolik Lake, east of outlet stream, west of runway. 68°38' N, 149°36' W.

Physiographic position: Glaciofluvial outwash.

Topography: Featureless ground.

Microrelief height - 10 cm.

Drainage: Moderately well drained.

Vegetation: Dry *Betula nana*, *Hierochloë alpina*, *Cladonia arbuscula* low-shrub, fruticose-lichen tundra.

Parent material: Itkillik II glaciofluvial outwash.

Sampled by: D.A. Walker and C. Westberg, August 12, 1989.

Remarks: Deep active layer in rocky soils. Shrub height 25 - 30 cm.

Weather: Partly cloudy, light wind.

Colors are for the damp soil.

- Oi 0 - 2 cm. Birch leaves and moss bases (mostly *Dicranum* spp. and *Aulacomnium turgidum*); wavy abrupt boundary.
- Oa1 2 - 7 cm. Very dark brown (7.5YR 2/3) highly organic loam; loose structure; dry; wavy abrupt boundary.
- Oa2 7 - 11 cm. Dark brown (7.5YR 4/3) gravelly sandy loam; weak medium subangular blocky, breaking to a weak fine granular structure; damp; friable (moist), smooth, sticky, plastic (wet); pH = 3.8; est. 20 percent fine gravel; (Sample T -167).
- Bw 11 - 21 cm. Strong brown (7.5YR 4/5) very gravelly sandy clay loam; loose single grain structure; damp; gritty (wet); pH = 4.3; est. 75 percent gravel; roots penetrate to 20 cm; wavy abrupt boundary. (Sample T-168).
- C 21 - 30+ cm. Very dark gray (10YR 3.5/1.5) very gravelly loamy sand; loose single grain structure; damp; gritty (wet); pH = 5.1; est. 80 percent gravel. (Sample T-169).

Plot SWT-75 Soil Description

Classification: Histic Pergelic Cryaquept, coarse-loamy, mixed, nonacid.

Location: Southwest side of Toolik Lake. Water track transect. 68°37' N, 149°38' W.

Physiographic position: Water track margin on side slope, Itkillik glaciated surface.

Topography: Featureless. Slope angle 2° N.

Microrelief height: 10 - 15 cm.

Drainage: Poorly drained.

Vegetation: Moist *Betula nana*, *Rubus Chamaemorus*, *Hylocomium splendens* low- shrub tundra.

Parent material: Colluvial deposit over till.

Sampled by: D.A. Walker and C. Westberg, August 21, 1989.

Remarks: Water table at 20 cm. Permafrost at 31 cm.

Weather: Clear, warm.

Colors are for the wet soil.

- Oi 0 - 5 cm. Loose fibric mosses *Hylocomium splendens*, *Sphagnum* sp. and *Aulacomnium turgidum*; pH = 4.2; abrupt smooth boundary. (Sample T -177).
- Oe 5 - 10 cm. Very dark brown (7.5YR 2.5/2) loose mat of hemic material, mostly mosses; wet; pH = 5.2; many fine and very fine roots; abrupt smooth boundary. (Sample T-178).
- Oa1 10 - 13 cm. Very dark brown (7.5YR 2/1.5) silty organic; weak fine granular structure; wet; smooth, mostly sticky, mostly plastic (wet); smooth abrupt boundary.
- Oa2 13 - 18 cm. Dark reddish brown (5YR 3/4) silty organic; loose structure; wet; smooth, mostly sticky, mostly plastic (wet); pH = 4.5; smooth abrupt boundary. (Sample T-179).
- Bhs 18 - 31+ cm. Dark brown (10YR 3.5/3) loam; weak medium subangular blocky, breaking to weak fine granular structure; wet; smooth, slightly sticky, slightly plastic (wet); pH = 4.3. (Sample T-180).

Plot SWT-79 Soil Description

Classification: Histic Pergelic Cryaquept, coarse-loamy, mixed, nonacid.

Location: Southwest side of Toolik lake. Toolik water track study. 68°37' N, 149°38' W.

Physiographic position: Middle part of long N-facing slope on 5 percent NNE-facing back slope of water track.

Topography: Well developed water track.

Microrelief height: 5 - 10 cm.

Drainage: Poorly drained.

Vegetation: Moist *Salix planifolia* ssp. *pulchra*, *Rubus chamaemorus*, *Sphagnum rubellum*, *Sphagnum* spp. low shrubland.

Parent material: Alluvial deposit over till.

Sampled by: D.A. Walker and C. Westberg, August 22, 1989.

Remarks: Shrubs to 47 cm. Water table at 10 cm. Permafrost at 43 cm.

Weather: Clear, breezy.

Colors are for the wet soil.

- Oi 0 - 4 cm. *Sphagnum* mat; loose structure; pH = 4.5; smooth abrupt boundary. (Sample T-189).
- Oe1 4 - 7 cm. Very dark brown (7.5YR 2/2) mostly hemic sedge roots and unrecognizable plant fiber; loose platy structure; wet; pH = 5.8; est. 30 percent plant fiber recognizable after rubbing; smooth abrupt boundary. (Sample T-190).
- Oe2 7 - 12 cm. Dark reddish brown (5YR 3/5) hemic material, mostly *Sphagnum*; loose structure; wet; pH = 4.5; est. 50 percent plant fiber recognizable after rubbing; smooth abrupt boundary. (Sample T-191).
- Oa 12 - 20 cm. Dark brown (7.5YR 3.5/3) loam; weak medium platy, breaking to weak fine granular structure; wet; smooth, slightly sticky, slightly plastic (wet); pH = 4.2; wavy abrupt boundary. (Sample T-192).
- IICox 20 - 32 cm. Brown (10YR 4.5/3) sandy clay loam, with many medium distinct strong brown (7.5YR 4/6) mottles; fine platy structure; wet; gritty, sticky, plastic (wet); pH = 4.5; est. up to 5 percent gravel to 1 cm diameter. (Sample T-193).

Plot Photos
SWT-1

Soil photo



SWT-2



SWT-3



SWT-4



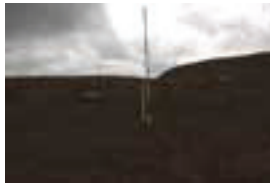
SWT-5



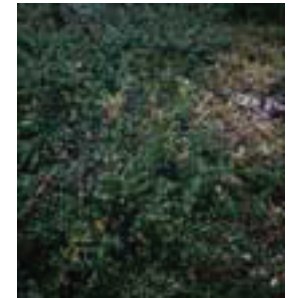
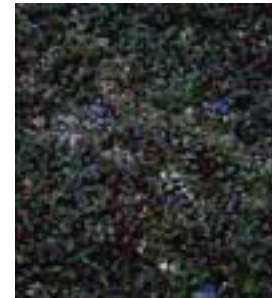
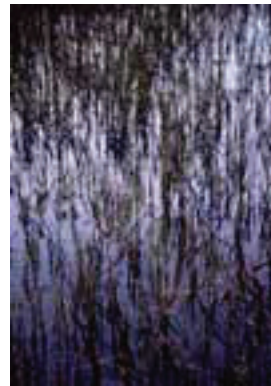
SWT-6



General site photo



Vegetation photo



Soil photo



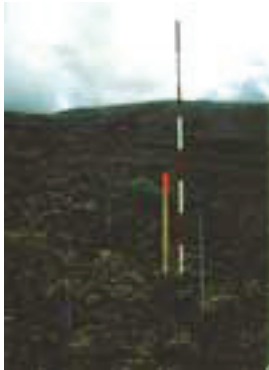
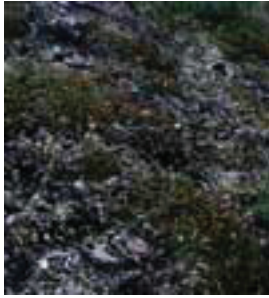
General site photo



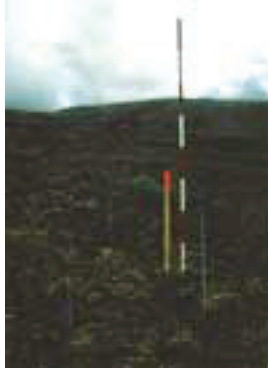
Vegetation photo



SWT-8



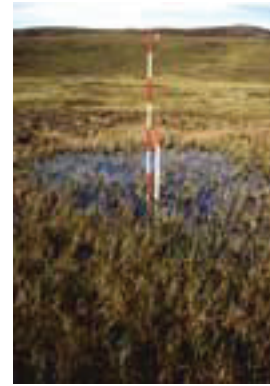
SWT-9



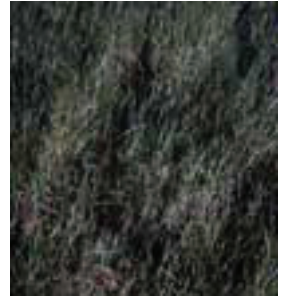
SWT-11



SWT-12



SWT-13



SWT-14

SWT-15

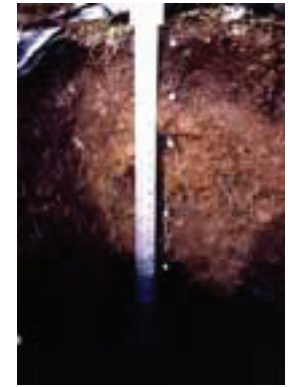
SWT-16

SWT-17

SWT-18

SWT-19

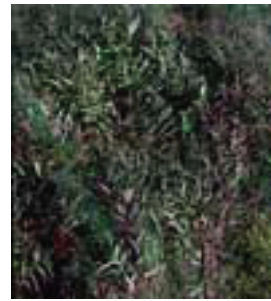
Soil photo



General site photo



Vegetation photo



Plot Photos
SWT-20

Soil photo



SWT-21



SWT-22



SWT-23



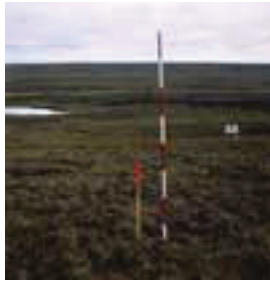
SWT-24



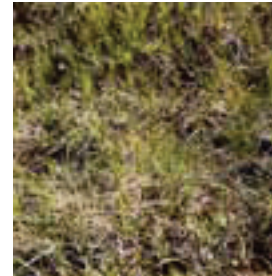
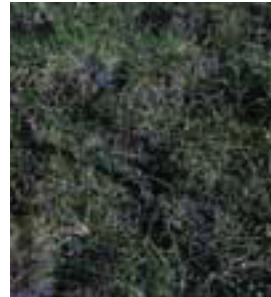
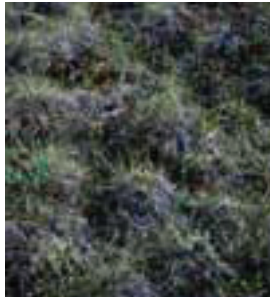
SWT-25



General site photo



Vegetation photo



Plot Photos
SWT-26

Soil photo



SWT-27



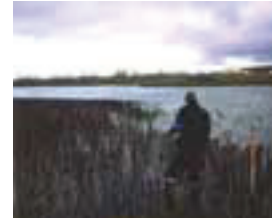
SWT-28



SWT-29



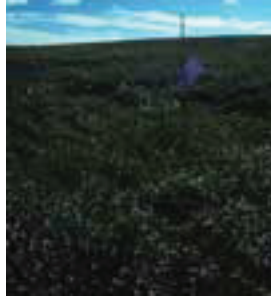
SWT-30



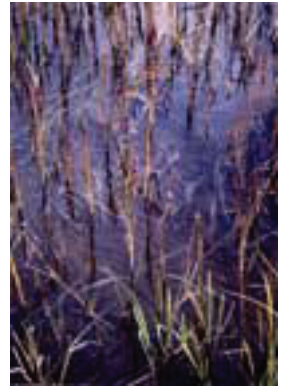
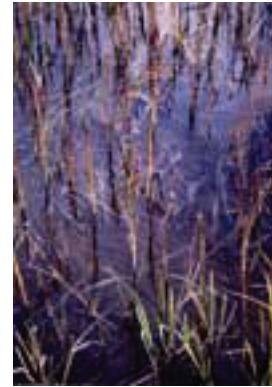
SWT-31



General site photo



Vegetation photo



Plot Photos
SWT-32

Soil photo



SWT-33



SWT-34



SWT-35



SWT-36



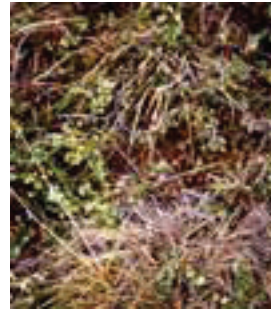
SWT-37



General site photo



Vegetation photo



Plot Photos
SWT-38

Soil photo



SWT-39



SWT-40



SWT-41



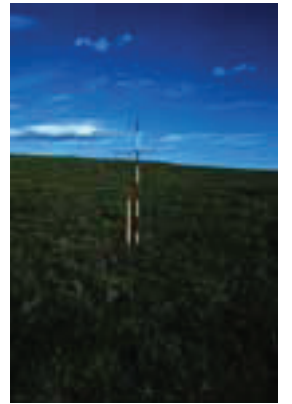
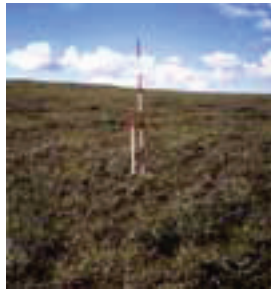
SWT-42



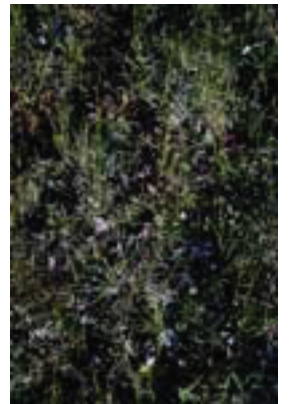
SWT-43



General site photo



Vegetation photo



Plot Photos
SWT-44

Soil photo



SWT-45



SWT-46



SWT-47



SWT-48



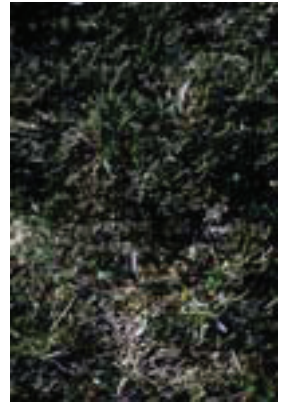
SWT-49



General site photo



Vegetation photo



Plot Photos
SWT-50

Soil photo



SWT-51



SWT-52



SWT-53



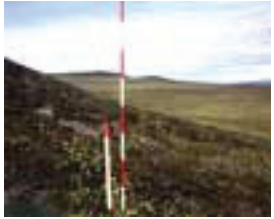
SWT-54



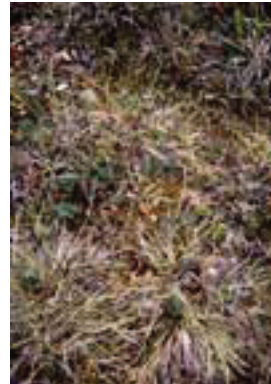
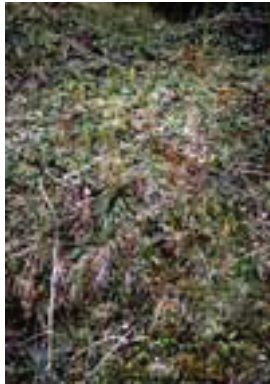
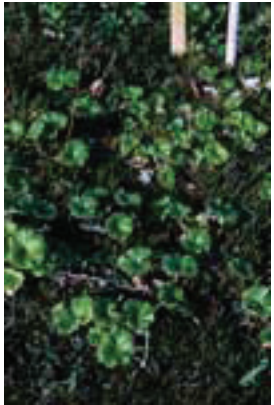
SWT-56



General site photo



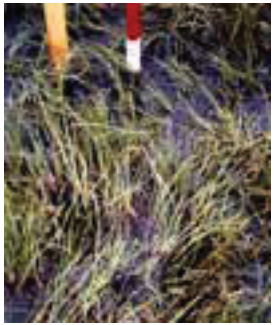
Vegetation photo



Soil photo



General site photo



Vegetation photo

SWT-58



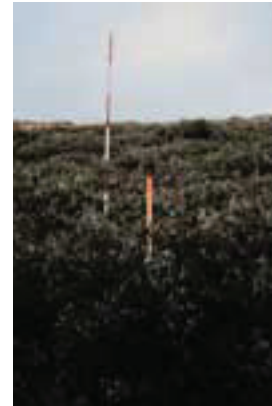
SWT-59



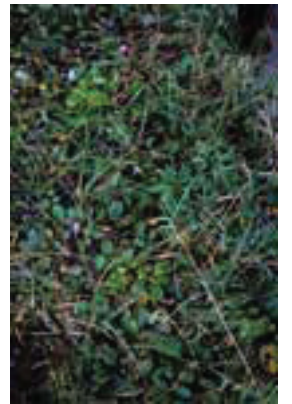
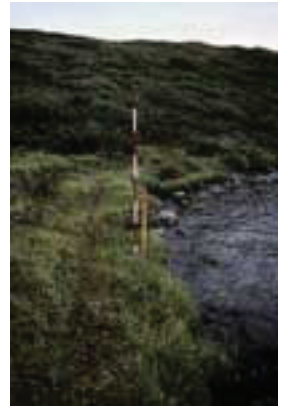
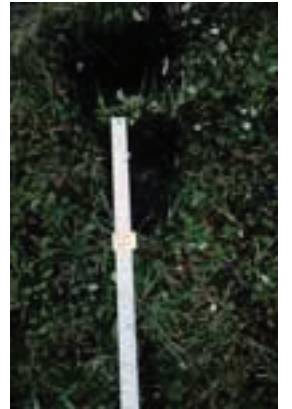
SWT-60



SWT-61

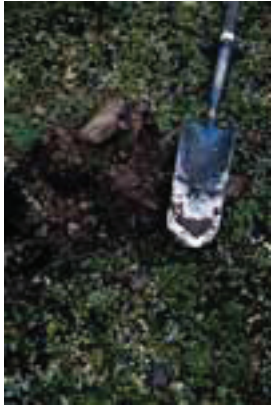


SWT-62



Plot Photos
SWT-63

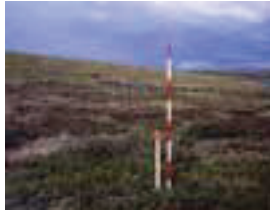
Soil photo



SWT-65



SWT-66



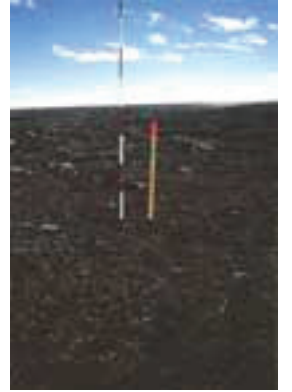
SWT-67



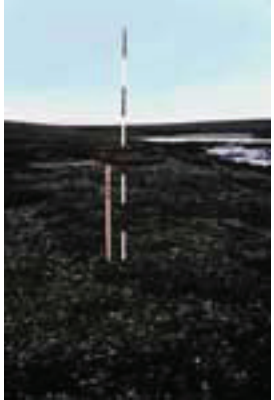
SWT-68



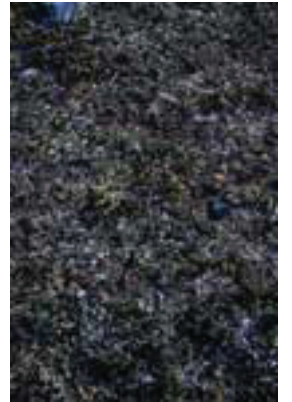
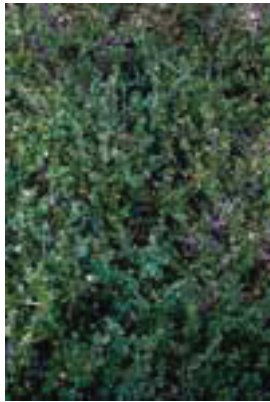
SWT-69



General site photo



Vegetation photo



Soil photo



SWT-71



SWT-72



SWT-73



SWT-74



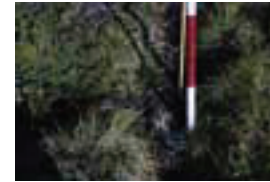
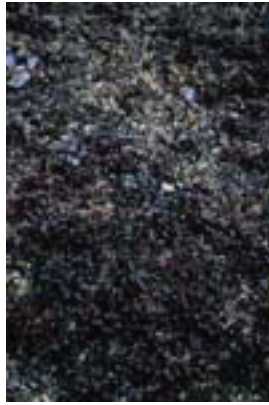
SWT-75



General site photo



Vegetation photo



Soil photo



General site photo



Vegetation photo

