

# **ANNOTATED BIBLIOGRAPHY**

## **1995-1996 and 1996-1997**



**Sectoral Policy Division**

**MAY  
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## TABLE OF CONTENTS

<b>FOREWORD</b> .....	iii
<b>INTRODUCTION</b> .....	1
<b>ANNOTATED BIBLIOGRAPHY BY UNIVERSITY 1995</b>	
UNIVERSITY OF ALBERTA .....	5
UNIVERSITY OF BRITISH COLUMBIA .....	13
UNIVERSITY OF GUELPH .....	15
UNIVERSITÉ LAVAL .....	17
UNIVERSITY OF MANITOBA .....	49
UNIVERSITÉ MCGILL .....	53
MEMORIAL UNIVERSITY .....	55
UNIVERSITÉ DU QUÉBEC À CHICOUTIMI .....	57
UNIVERSITÉ DU QUÉBEC À MONTRÉAL .....	61
QUEEN'S UNIVERSITY .....	63
UNIVERSITY OF SASKATCHEWAN .....	71
SIMON FRASER UNIVERSITY .....	75
UNIVERSITY OF TORONTO .....	77
TRENT UNIVERSITY .....	81
UNIVERSITY OF VICTORIA .....	83
UNIVERSITY OF WATERLOO .....	85
WILFRID LAURIER UNIVERSITY .....	89
<b>ANNOTATED BIBLIOGRAPHY BY UNIVERSITY 1996</b>	
UNIVERSITY OF ALBERTA .....	93
UNIVERSITY OF BRITISH COLUMBIA .....	107
CONCORDIA UNIVERSITY .....	109
UNIVERSITÉ LAVAL .....	111

UNIVERSITY OF MANITOBA .....	125
MEMORIAL UNIVERSITY .....	127
UNIVERSITÉ DE MONTRÉAL .....	129
UNIVERSITÉ DU QUÉBEC À CHICOUTIMI .....	131
UNIVERSITÉ DU QUÉBEC À MONTRÉAL .....	135
QUEEN'S UNIVERSITY .....	137
UNIVERSITY OF SASKATCHEWAN .....	139
SIMON FRASER UNIVERSITY .....	145
UNIVERSITY OF TORONTO .....	147
TRENT UNIVERSITY .....	149
UNIVERSITY OF VICTORIA .....	151

**INDEX**

Author Index .....	157
Index by Discipline .....	167
Index by Fieldwork Location .....	171

## **FOREWORD**

The annotated bibliography is produced on a bi-annual basis. This is the twelfth annotated bibliography based on research which has been fully or partly funded by the Northern Scientific Training Program (NSTP). It is a combination of 1995-1996 and 1996-1997 research years.

Its aim is to provide a perspective on the range of research projects supported by the NSTP, and is designed to promote the exchange of information and collaboration among academics, northern experts and northern communities. Moreover, it demonstrates the significance of northern scholarship resulting from the Program.

The preparation of this bibliography has resulted from the collective efforts of several people. Accordingly, I would like to thank Ms. Lynda Brown and Ms. Julie Boucher-Savoie for their assistance in the preparation of this publication and Ms. Rhonda Turner for her overall coordination of the project.

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## INTRODUCTION

This annotated bibliography comprises the abstracts of theses, essays, reports, seminar and conference presentations, and other scientific papers based on projects supported by the Northern Scientific Training Program. All the abstracts were submitted, published or presented in 1995 or 1996.

The information contained in this bibliography was compiled mainly from the NSTP research reports submitted by universities for the 1995-1996 and 1996-1997 research years. All information was checked for accuracy through follow-ups with the participating universities.

The first two sections of the bibliography (1995 and 1996) are alphabetically organized by university and by author. The bibliographical references were completed using the following criteria: author, abstract<sup>1</sup>, discipline and fieldwork location. The indices of the bibliography are divided into three: author, discipline and fieldwork location.

The NSTP Secretariat received submissions from 17 Canadian universities for the 1995-1996 research year, for a total of 122 bibliographical entries. During 1996-1997, abstracts were submitted by 15 universities, for a total of 89 bibliographical entries.

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<sup>1</sup> This symbol "7/6" was used to condense those abstracts/descriptions which were of considerable length.



**ANNOTATED BIBLIOGRAPHY BY UNIVERSITY 1995**





## UNIVERSITY OF ALBERTA

**95-001 ANDERSON, A.K. (1994).** The invasion of 50-year-old tundra disturbances by arboreal species. Thesis Report, Faculty of Science, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Several types of disturbances along the Canol Road in the Mackenzie Mountains, N.W.T. were studied for the occurrence of tree species and factors affecting their establishment. Four species of trees were found in the disturbances: *Picea glauca*, *Picea mariana*, *Abies lasiocarpa*, and *Populus balsamifera*. *P. balsamifera* was most commonly found along the shoulder of the Canol Road and in borrow pits. The conifers were most abundant along the multi-use vehicle tracks which had an organic substrate, but also were found on other disturbances. Data were collected on clone or tree characteristics, soil properties and site characteristics. Density of poplar trees in clones and the height of the tallest tree were affected by the disturbance type, but growth increments of poplar and spruce were not different among disturbances. The factors most related to these similarities and differences are soil temperature, moisture and nutrient content.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Canol Road, Mackenzie Mountains, N.W.T.

**95-002 ENGLEFIELD, P.G.C. (1995).** Rate of permafrost degradation in peatlands. M.A. Thesis, Faculty of Science, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Due to the insulating properties of dry peat, permafrost at its southern limit occurs mainly in peatlands, where it is found in raised mounds or plateaus because of the expansion of freezing water. The dry peat on the surfaces of plateaus protects the permafrost from summer heat. However, because peat forms in wet conditions, peat plateaus are usually surrounded by wetlands, and often by standing water. The standing water acts as a heat conductor, causing the permafrost core to melt from the sides. Peat plateaus have been found to undergo cycles of aggradation and collapse. Fire is a major trigger for peat plateau collapse because it can consume the insulating peat. The peat plateau surface provides a suitable habitat for tree growth. Trees on the subsiding plateau edges die when their roots drown in the wetlands. The dead trees provide a record of the location of the plateau edge over time because their dates of death, determined by cross dating, indicate when they were deposited into the water. Study sites were at Hotchkiss and Lutose in northern Alberta and Sandy Lake in the Northwest Territories.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Hotchkiss and Lutose, Northern Alberta; Sandy Lake, N.W.T.

**95-003 FRANCIS, S. (1995).** Fire History and Forest Disturbance in the Shakwak Trench, Yukon Territory. Research Report, Department of Renewable Resources, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Wildfire and insects play an important regulatory role and are the primary sources of disturbance and renewal in the boreal forest. Fire has long been recognized as an exceedingly important ecological force in the North American boreal forest; some have even termed this biome “fire-adapted”. However, forest insects, primarily spruce beetles (*Dendroctonus rufipennis* Kirby) in *Picea* dominated systems, are also important stochastic regulatory agents. Interaction between these two natural disturbance mechanisms may ultimately control the large-scale landscape dynamics of this region and create a heterogeneous mosaic of forest types upon which many wildlife species are dependent. Using dendroecological techniques and GIS technology, I am examining spatial and temporal patterns of wildfire and insect outbreak in a 300 km<sup>2</sup> montane sub-alpine valley near Kluane Lake in southwestern Yukon. Results of this investigation may have applicability to the front ranges of Alberta’s Rocky Mountains. This research project is being carried out in collaboration with the Kluane Boreal Forest Ecosystem Project.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Kluane Lake, Yukon.

**95-004 HORVATH, C.L., ROBINSON, S.D. and KETTLES, I.M. (1995).** An investigation of palsa fen stratigraphy and permafrost characteristics using ground penetrating radar, Macmillan Pass, N.W.T. Research Report, Department of Geography, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Sub-surface stratigraphy and permafrost stability were investigated at two palsa fen sites near Macmillan Pass, Northwest Territories, using ground penetrating radar (GPR) and conventional techniques. To examine frozen-unfrozen and peat-sediment interfaces in the fens, GPR surveys were conducted along intersecting transects at each site. Coring was also conducted to support the interpretation of the GPR results. Thaw depths along the transects measured at the time of the GPR surveys ranged from 28 cm to greater than 90 cm. The palsas range in height from 0.6 m to 3.0 m; long axes range from 10.5 m to 47.5 m. In areas of unfrozen peat, the GPR returns were generally characterized by laterally-continuous reflectors and shallow penetration, in contrast to returns from frozen peat, which were typically chaotic, with little lateral continuity, and greater penetration. Thawing at the base

of permafrost at the Porsild's Field site is inferred from the GPR results, coring confirmed the presence of unfrozen peat below frozen peat at 5 m depth. These data suggest continued degradation of the palsas at this site, as previously reported in the literature. Ongoing work involves the application of processing enhancements modified from seismic techniques, to reduce the distortions produced by diffractions, noise and weak signals.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Macmillan Pass, N.W.T.

**95-005 HOWLAND, K.L. (1995).** Life history variation of inconnu in the Mackenzie River System. Research Report, Department of Life Sciences, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The freshwater inconnu do mature earlier and do not live as long as the anadromous form; but they also have a higher growth rate, which was not as expected. Whitefish are noted for having highly plastic life histories, so the observed differences in growth and age at maturity could be simply the result of differences in environments in which the juveniles of these two forms of inconnu live. The freshwater inconnu of the Slave River are located farther south and may therefore have a longer growing season. This can have a strong influence, particularly at the juvenile stage when growth is usually rapid and highly dependent on food availability. Another possibility is that fishing is responsible for some of the differences: with exploitation in fish populations, growth rates tend to increase, while age maturity decreases.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Arctic Red River, N.W.T.

**95-006 HOWLAND, K.L., TALLMAN, R.F. and TONN, W.M. (1994).** "Life history variation of inconnu, *Stenodus leucichthys*, in the Mackenzie River System." Arctic Institute of North America, 21(4):4-7.

**ABSTRACT/DESCRIPTION:**

Current models of life history variation with support from observational data suggest a correlation between migratory behaviour and life history characteristics, such that long distance anadromous migrants mature later, grow faster, and have higher age-specific fecundity than short distance migrants or residents of the same species. In this study, we are comparing migratory movements and life history characteristics of resident and anadromous inconnu, *Stenodus leucichthys*, to determine if observed differences fit with predictions derived from models of life history variation. Anadromous inconnu from the Arctic Red River area are being sampled for length, weight, sex, maturity, age and fecundity; migratory

movements are being monitored using radio-telemetry. These data will be compared with those of resident inconnu, collected from the Slave River in 1994. A preliminary comparison of migration timing and distance for the two forms is presented using key data for anadromous inconnu and Slave River data taken from a consultant report.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Slave River and Arctic Red River, N.W.T.

**95-007 HOWLAND, K.L., TALLMAN, R.F. and TONN, W.M. (1995).** The influence of migration on life history: a comparison of two populations of inconnu, *Stenodus leucichthys*, in the Mackenzie River system. Presentation, Prairie Universities Biological Symposium, Winnipeg.

**ABSTRACT/DESCRIPTION:**

Current models of life history variation, with support from observational data, predict a strong correlation between migratory behaviour and the evolution of life histories in migratory fishes. To test these predictions, we compared life history characteristics of two populations of inconnu from the Mackenzie River system, N.W.T., thought to differ in migratory behaviour. Inconnu in the lower Mackenzie River system, north of Norman Wells, are anadromous, whereas those in Great Slave Lake are thought to represent a freshwater form. Between 1992 and 1994, inconnu were collected from the Arctic Red River, a tributary of the lower Mackenzie, and from the Slave River, tributary to Great Slave Lake. For each population, we determined distributions of length, body weight, gonad weight, sex, stage of maturity and age. Inconnu from the anadromous population grow slower, mature later, and live to older ages than inconnu from the freshwater population. Although no apparent geographic barriers exist between the lower Mackenzie River and Great Slave Lake, there appears to be two distinct life history forms of this species that are related to migratory behaviour.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Slave River and Arctic Red River, N.W.T.

**95-008 HUNT JONES, M. (1995).** Experimental investigations into effects of climate change on high Arctic plants. Ph.D. Thesis, Faculty of Science, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The purpose of this research was to describe the initial, short-term responses of high Arctic plant species to experimental conditions simulating predicted climate changes. This work was conducted at Alexandra Fiord, on Ellesmere Island, Canada, as part of the International Tundra Experiment. Beginning in 1992, tundra soil was warmed up to 6°C above control

plots using small, open-top greenhouses. For the arctic willow, *Salix arctica*, catkin and leaf fascicle lengths, stem increments, and specific leaf areas were greater for experimentally warmed plants, and the effect was substantially more pronounced for willows in a dry (vs. wet) community over three seasons.

**DISCIPLINE:** Resource Management

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.

**95-009 KIDD, K.A., SCHINDLER, D.W., HESSLEIN, R.H. and MUIR, D.C.G. (1995).**

“Correlation between stable nitrogen isotope ratios and concentrations of organochlorines in biota from a freshwater food web”. The Science of the Total Environment, 160/161:381-390.

**ABSTRACT/DESCRIPTION:**

The relationship between total concentrations of hexachlorocyclohexane (3 HCH), DDT, and chlorinated bornanes (toxaphene, 3 CHB) and the trophic position of biota from a subarctic lake was investigated using stable isotope ratios of nitrogen ( $^{15}\text{N}/^{14}\text{N}$ ). Zooplankton, benthic invertebrates, and forage and piscivorous fishes were analysed for  $^{15}\text{N}/^{14}\text{N}$  and organochlorines using mass spectrometry and high resolution capillary gas chromatography (GC-ECD), respectively. The trophic relationships of the biota were clearly defined, with  $^{15}\text{N}/^{14}\text{N}$  increasing an average of 3.3 percent from prey species to predator. Mean concentrations of 3 HCH were lowest in chironomids (subfamily *Chironominae*, 0.2 ng/g wet wt.) and highest in burbot liver (*Lota lota*; 30.2 ng/g wet wt.). Mean concentrations of 3 DDT and 3 CHB ranged from 0.5 and 2.0 (ng/g wet wt.), respectively, in snails (Family *Limnacididae*) to 3430 and 2820 (ng/g wet wt.) in burbot liver. Regression analyses indicated that both the wet and lipid weight concentrations of 3 HCH, 3 DDT and 3 CHB in the biota from this food web were significantly related to trophic position, as defined by  $\delta^{15}\text{N}$ . Results from this study indicated that  $\delta^{15}\text{N}$  can be used to predict concentrations of organochlorines in freshwater biota.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**95-010 KIDD, K.A., SCHINDLER, D.W., HESSLEIN, R.H. and MUIR, D.C.G. (1995).** Use of stable nitrogen isotope ratios in studies of contaminant bio-accumulation in subarctic and arctic freshwater foodwebs. Paper, Meeting, Reno, Nevada, June 8-10, 1995.

**ABSTRACT/DESCRIPTION:**

Considerable variability exists in the concentrations of persistent organochlorine contaminants

(e.g., toxaphene, PCBs, DDT) in fishes from Canadian subarctic and Arctic lakes. Contaminant concentrations an order of magnitude higher than at other remote northern sites have been found in fishes from Lake Laberge, Yukon and Peter Lake, N.W.T., Canada. Values are comparable to those found in the same species from the Great Lakes. We used stable nitrogen isotope ratios ( $^{15}\text{N}$ ) to characterize food web structure of these lakes and other sites, and investigated the potential for  $^{15}\text{N}$  to explain inter- and intra-lake variability in fish contaminant concentrations.  $^{15}\text{N}$  measurements were used to determine the trophic position of benthic invertebrates, zooplankton, and forage and piscivorous fishes collected from these lakes. Concentrations of persistent contaminants in biota were positively correlated ( $r^2 = 0.67$  to  $0.81$ ) to  $^{15}\text{N}$  through the food webs of all lakes, and the slopes of these relationships were greater for organochlorines with higher biomagnification potential.  $^{15}\text{N}$  results indicated that fishes from Lake Laberge and Peter Lake, feed at a higher trophic level than in other lakes, and this factor alone may be responsible for elevated contaminant concentrations in these fishes.  $^{15}\text{N}$  has significant potential for interpreting the concentrations of persistent contaminants in freshwater food webs.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Lake Laberge, Yukon and Peter Lake, N.W.T.

**95-011 LISTON, M.L. (1995).** Fire Frequency based on carbon analyses. Progress Report, Canadian Circumpolar Institute, Department of Renewable Resources, University of Alberta.

**ABSTRACT/DESCRIPTION:**

This study has three main objectives: 1) to be able to identify the “major” terrestrial vegetation of the northern boreal forest by using charcoal particle identification; 2) to determine in the field, the relationships between particle transport and particle size, fire type and intensity; and 3) to use this information to reconstruct the detailed fire history of the northern part of Wood Buffalo National Park and the associated vegetation changes.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Wood Buffalo National Park, N.W.T.

**95-012 PURDY, B.G. (1995).** Genetic variation in the endemic plants of the Athabasca sand dunes: origin, evolution, and implications for conservation. Ph.D. Thesis, Faculty of Science, University of Alberta.

**ABSTRACT/DESCRIPTION:**

In this study, we compared the genetic variation within and among populations of five

endemic plant taxa from the Athabasca sand dunes in northern Saskatchewan, Canada, with the related geographically widespread species from which they are thought to have evolved. The results largely conformed with theories and empirical evidence that suggest restricted species have less genetic variation than widespread species. <sup>2</sup> Š All of the endemic species had high genetic identity with progenitor populations, regardless of the sympatric or allopatric nature of their respective distributions. These data support previous suggestions that the endemics have evolved on the Athabasca sand dunes during the Holocene. Conservation recommendations were made for preserving the endemic plants and their genetic diversity in light of the information provided from this study.

**DISCIPLINE:** Botany.

**FIELDWORK LOCATION:** Athabasca Sand Dunes, Northern Saskatchewan.

**95-013 ROSS, J.M. (1995).** The archaeo botanical remains from Garden Under Sandet. Research Report, Conference: A thousand years of Greenland natural and Cultural history, November 12, 1995.

**ABSTRACT/DESCRIPTION:**

The archaeobotanical potential of Garden Under Sandet (GUS) site is exceptional. As the excavation only occurred a few months ago there has not been time to analyse a statistical number of samples to provide secure results. This talk will overview the aims of the archaeo botanical investigation of GUS and highlight some of the emerging irregularities of the use of *Hippuris vulgaris* and *Salix* sp.

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Greenland.





UNIVERSITY OF BRITISH COLUMBIA

**95-014 MCLEOD, K. (1995).** Ecology of *Picea glauca* at its range limited in the frozen northeast of Canada. Paper, 25th Arctic Workshop, Université Laval, Québec, March 16-18, 1995.

**ABSTRACT/DESCRIPTION:**

Stunted and prostrate *Picea* (spruce) occur in scattered groups north of treeline. These groups, composed of krommhola and some erect stems, are referred to as tree islands. In north-central and northeastern Canada, tree islands are generally composed of *Picea mariana* (black spruce), whereas *Picea glauca* (white spruce) tree islands predominate in northwestern Canada. Sixteen tree islands have been mapped along Tuktoyaktuk Peninsula; fifteen with *Picea glauca* and two with *Picea mariana*. Maintenance of these tree islands is by both vegetative and sexual reproduction. Excavation of subsurface connections between individuals indicates reproductive origin by layering. At four intensively studied sites the proportion of the three island population that had established by layering ranged from 54 percent to 90 percent. Across this region, only two seedling were found, located next to each other at one site. Current sexual reproductive capacity was examined through germination tests on seeds and from seedbank soil samples taken within and outside each tree-island. Results of tests on seed produced in 1993 indicated only 0.1 percent were viable. No spruce seeds germinated from the seedbank soil samples. If it is assumed that a lack of sexually produced individuals and seedlings, and an absence of viable seed production are appropriate indicators of tree populations not in equilibrium with current climatic conditions, then preliminary results suggest that the *Picea glauca* tree islands along Tuktoyaktuk Peninsula are relic in nature.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Tuktoyaktuk Peninsula, N.W.T.



## UNIVERSITY OF GUELPH

**95-015 DUFRESNE, F. and HEBERT, P.D.N. (1995).** Polyploidy and clonal diversity in an Arctic cladoceran. Research Report, Department of Zoology, University of Guelph.

**ABSTRACT/DESCRIPTION:**

Genome size determinations were coupled with allozyme and mtDNA studies to gain insights into the origin of polyploidy and clonal diversity in populations of *Daphnia tenebrosa* from Churchill, Manitoba. Allozyme variation at five enzyme loci allowed the detection of 32 clones. Analysis of 73 populations in 1981, 27 in 1987 and 45 in 1991 revealed that clonal frequencies were relatively stable and that *D. Tenebrosa* was more clonally diverse (average of three clones per pond) than other species of the *D. pulex* complex at the same site. Genome size determination revealed the presence of two assemblages with averages of 0.53 ( $\pm 0.01$ ) pg and 0.89 ( $\pm 0.03$ ) pg, corresponding to diploid and tetraploid clones. Clustering of allozyme distances revealed three groups, with no association between ploidy level of pigmentation. Similarly, diploid and polyploid clones did not form distinct clusters on the mtDNA dendrogram. The high sequence divergence between the two mtDNA clusters as well as the lack of correspondence between allozyme distance and mtDNA divergence among clonal pairs suggest that polyploidy arose following reciprocal hybridizations between genetically divergent populations of this species.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Churchill, Northern Manitoba.



## UNIVERSITÉ LAVAL

**95-016 ALLAIRE, N., PIENITZ, R. and CAMBURN, K. (1995).** Preliminary analysis of diatom assemblages and their relationship to environmental variables in 65 Labrador lakes. Poster, 13th North American Diatom Symposium, Milford, Iowa, October 1995.

**ABSTRACT/DESCRIPTION:**

This study is part of a larger project whose major objective is to determine the effects of climate and climate-related factors on diatom distributions in lakes from northern Canada. The 65 study sites located along a latitudinal gradient in Labrador that includes a strong vegetational gradient of boreal forests in the south to Arctic tundra conditions in the North (between 51° and 58° N). This project aims at determining the relationship between surficial diatom assemblages and environmental variables using multi variate statistical methods. Canonical correspondence analysis will be used to investigate the relationship between modern diatom assemblages and associated environmental variables from the calibration set of lakes. Diatom-inference models will be developed for the reconstruction of environmental variables using weighted-averaging regression and calibration. Because this project is still at an early stage, we are presenting the preliminary results focusing on different aspects of the modern diatom flora. Diatoms in lakes located in the boreal forest seem to be dominated by species of the genera *Fragilaria* (e.g., *F. construens* var. *venter*, *F. pinnata*) and *Aulacoseira* (*A. distans*, *A. lirata*). The transitional forest-tundra is characterized by an increase in diatoms from the genera *Cymbella* (*C. gaeumannii* and *Cyctotella* (*C. stelligera*). Assemblages in the tundra region are mainly dominated by *Achnanthes* spp. (e.g., *A. marginulata*).

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Labrador.

**95-017 ALLARD, M., CARON, S. and BÉGIN, Y. (1995).** Climatic and ecological controls on ice segregation and thermokarst: the case history of a permafrost plateau in northern Québec. Paper, Frozen Ground Workshop, International Permafrost Association, Hanover, U.S.A., December 1995.

**ABSTRACT/DESCRIPTION:**

The reconstruction of the historical evolution of a typical permafrost plateau was done at a site selected along the shore of Hudson Bay. The attempt was done by using data from four thermistor cables, cryostratigraphic data from 25 boreholes spread over the permafrosted area, repeated snow surveys, and dendrochronological analysis on 209 spruce trees over the flanks and the top of the plateau.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Hudson Bay, Northern Québec.

**95-018 ARSENEAULT, D. et PAYETTE, S. (1995).** Influence de la déforestation subarctique sur la dynamique des tourbières. Rapport d'étude, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Les macrorestes d'épinettes noires (*Picea mariana*) enfouis dans des mares ont été utilisés pour reconstituer l'histoire de deux tourbières subarctiques depuis la fin du XIe siècle. Les sites étudiés sont localisés au sommet d'une colline fortement exposée et dans une vallée protégée. Des formations conifériennes denses s'y sont maintenues par marcottage entre les XIe et XVIIe siècles, bien que des individus érigés et prostrés aient dominé dans la vallée et sur la colline, respectivement. Les deux sites ont enregistré une réponse similaire après que les formations conifériennes environnantes aient été transformées en lichenaies par un feu en 1568 AD. Un dépérissement rapide des tiges supra nivales a été suivi d'une mortalité généralisée des épinettes due à l'ouverture du milieu, à la modification des conditions d'enneigement, à la formation de pergélisol, à une modification du régime de drainage et au développement des mares. En raison d'une exposition moins sévère, le site de la vallée n'a subi aucune modification détectable avant le début de la période froide du Petit Âge glaciaire (en 1590 AD), alors que la réponse du site exposé fut immédiate. Ces résultats mettent en évidence la grande sensibilité des milieux subarctiques aux processus stimulés par le froid et le tamponnement des conditions hivernales par la végétation coniférienne.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-019 ARSENEAULT, D. and PAYETTE, S. (1995).** Reconstruction of stand dynamics over the last 2500 years from spruce remains in a treeline peatland. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

Stem remains of black spruce (*Picea mariana* (Mill. BSP.) buried in a permafrost treeless peatland were used for the reconstruction of the long-term forest dynamics at treeline in northeastern Canada. Because most spruce remains were well preserved, forest development was assessed from stem morphology (growth form) and tree ring patterns. The peatland border was colonized by a spruce forest from at least 500 BC (2500 BP) to 1568 AD. Most spruce individuals showed an erect, monopodial bole with only minor stem damage at the snow-air interface. The forest successfully regenerated after two fire events around 350 BC and 10 AD. The number of damaged stems at the snow-air interface increased after another fire around 700 AD, although faster ring growth occurred between 860 and 1000 AD

(Medieval period). The forest shifted to an open krummholz after the last fire in 1568 AD because of reduced post-fire regeneration and site opening. Reforestation of the site would necessitate sustained warmer conditions than those presently prevailing there.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**95-020 BEAULIEU, J., GAUTHIER, G. and ROCHEFORT, L. (1995).** Growth responses of plants to goose grazing in a high Arctic environment. Paper, Colloque annuel, Centre d'études nordiques, Université Laval, December 1<sup>st</sup>, 1995.

**ABSTRACT/DESCRIPTION:**

The growth responses of plants to herbivory usually vary with the grazing regime experienced. As grazing pressure by Greater Snow Geese (*Chen caerulescens atlantica*) has been increasing on Bylot Island, N.W.T., in recent years, we studied the response of *Dupontia fisheri* and *Eriophorum scheuchzeri* to controlled grazing using captive goslings. We were particularly interested by (i) how the timing and the frequency of grazing affected plant growth, (ii) whether faeces stimulated plant growth after grazing, and (iii) whether the total non-structural carbohydrate reserve (TNC) in the below-ground parts of plants were affected by grazing. <sup>2</sup> § Over one season, the timing and the frequency of goose grazing had moderate effects on the growth of *Dupontia* and *Eriophorum*, whereas goose faeces had no effect. Although plants competed for lost tissues, grazing did not enhance plant growth and interfered with the accumulation of TNC.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-021 BERGERON, M. et WARWICK, F.V. (1995).** L'influence des facteurs physiques sur le réseau alimentaire microbien des lacs nordiques. Rapport d'étude, Colloque annuel, Centre d'études nordiques, Université Laval, 1er décembre 1995.

**RÉSUMÉ/DESCRIPTION:**

La structure du réseau alimentaire microbien a été déterminée pour 23 sites dans le nord du Québec, à l'aide de la microscopie à épifluorescence. Les organismes les plus abondants étaient les bactéries et les picocyanobactéries, montrant des concentrations respectives de  $1 - 14 \times 10^8$  et  $1 - 39 \times 10^6$  cellules par litre. Le picophytoplancton contribuait à plus de 53 pour-cent de la biomasse chlorophyllienne, tel que mesuré par filtration différentielle. Les flagelles dominaient la communauté nanoplantonique. L'abondance des bactéries et du nanoplanton augmentait avec une élévation de la température, tandis que les concentrations

de picoplancton autotrophe étaient indépendantes de la température. L'abondance du picoplancton hétérotrophe (bactérie) était positivement corrélée avec le coefficient d'atténuation de la lumière (K), ce qui suggère une relation avec le carbone organique dissout (COD) qui contrôlerait l'absorption de la lumière dans ces lacs. De la même façon, les concentrations de nanoplancton et de flagelles étaient corrélées avec K. Ces résultats mettent en évidence l'importance des composantes du réseau alimentaire microbien dans les lacs subarctiques et leur relation intime avec l'environnement physique.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-022 BERGERON, M. and WARWICK, F.V. (1995).** Microbial food web responses to ultraviolet radiation in a subarctic lake. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

The continuing degradation of the Earth's ozone layer by atmospheric pollutants has generated concern about the impact of increased solar ultraviolet-B radiation (W-B) on aquatic ecosystems. Stratospheric ozone depletion in the Northern Hemisphere appears to be proceeding at its fastest rate in the subarctic region. Lakes and wetlands are major components of the subarctic landscape, and these aquatic ecosystems may be especially vulnerable to rising W-B. In the present study we examined the effects of solar UV wavebands on trophic structure by way of in situ growth assays. These experiments were done at Lac à l'Eau Claire, a large (1269 km<sup>2</sup>) oligotrophic lake (0.2-2.0 mg Chl<sub>a</sub> L<sup>-1</sup>) situated in the subarctic region of Québec, 150 km inland from Hudson Bay. <sup>2</sup> <sup>§</sup> Our results indicate a differential growth response by organisms at the base of the microbial food web. Bacteria were highly resistant to the W-A and W-B radiation, phototrophic picoplankton were primarily inhibited by W-A, while both W-A and W-B inhibited the growth of the total community. These results imply that future increases in W-B radiation may influence trophic structure as well as productivity.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Lac à l'Eau Clair, Hudson Bay, Québec.

**95-023 BOIVIN, S. et BÉGIN, Y. (1995).** Reconstitution dendroécologique des conditions D'enneigement au Lac Bienville, Québec subarctique. Rapport d'étude, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**



L'étude des formes de croissance des arbres, résultant de conditions d'exposition variables, dans la région du Lac Bienville a permis de poser un diagnostic sur les variations du régime nival au cours des deux derniers siècles. Les changements observés dans la répartition nivale se traduisent chez les arbres par la présence de diverses anomalies morphologiques (cicatrice, mortalité d'axe et sur ramification sous-nivale) et sont enregistrés par les cernes annuels de croissance. L'analyse dendroécologique d'un front forestier établi après feu, en position riveraine, suggère d'abord une période de croissance difficile entre 1850 et 1860, où de nombreuses baisses du taux de croissance ont été observées et qui correspondraient, pour plusieurs individus, à la percée de la couverture nivale. Par la suite, un changement dans le régime des précipitations neigeuses à la fin du XIXe siècle, appuyé par la datation des diverses rections morphologiques (cicatrice et mortalité d'axe) aurait été l'élément déclencheur au développement de tiges supra nivales modifiant de nouveau la répartition de la couverture de neige. À l'exception des décennies 1930 et 1940, les conditions semblent avoir été favorables à une bonne croissance au cours du XXe siècle. Enfin, des relevés concernant la couverture de neige ont aussi permis de montrer certaines relations entre la localisation de certaines communautés végétales et l'épaisseur de neige. Le développement spatio-temporel de cette bordure forestière a donc été influencé par la distribution de la couverture de neige, résultant des changements du régime de précipitation et de l'évolution de la frange forestière elle même.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec Subarctique.

**95-024 CAMPEAU, S. and HÉQUETTE, A. (1995).** Reconstruction of Barrier Island migration using diatom analysis and ground penetrating radar, southern Canadian Beaufort Sea. Paper, 1st SEPM Congress on Sedimentary Geology, August 13-16, 1995, St. Pete Beach, Florida.

**ABSTRACT/DESCRIPTION:**

The coastline of the southeastern Canadian Beaufort Sea is essentially composed of eroding bluffs of unconsolidated Quaternary sediments, complex embayments formed by the breaching of thermokarst lakes, and spits and barrier islands which are experiencing rapid landward migration. Three boreholes were drilled on a barrier island and a barrier-spit, near Atkinson Point on the Tuktoyaktuk Peninsula. Ground penetrating radar profiles were also obtained on the same sites. These coastal accumulation landforms are presently migrating landward at a rate of 1.7 m a<sup>-1</sup>. The ecological coding of diatom species provides a valuable tool for reconstructing coastal sedimentary environments. This approach has rarely been used to document barrier island evolution. The migration of Atkinson Point barrier islands was reconstructed from the stratigraphic record by comparing the relative abundance of diagnostic taxa (ice, thermokarst lakes, lagoonal and marine planktonic, tycho planktonic and epipsammonic diatom species). This method provided additional evidence for the identification of sediments deposited in lacustrine and lagoonal basins, tidal channels and

washover deltas. Ground penetrating radar profiles allowed stratigraphic correlations between boreholes and enabled us to extend the biostratigraphic record to the entire barrier island.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Canadian Beaufort Sea.

**95-025 CAMPEAU, S., HÉQUETTE, A. et PIENITZ, R. (1995).** Distribution des assemblages modernes de diatomées et évolution des environnements côtiers de la mer de Beaufort. Rapport d'étude, Colloque annuel, Centre d'études nordiques, Université Laval, 1 décembre 1995.

**RÉSUMÉ/DESCRIPTION:**

Les assemblages de diatomées préservés dans les sédiments de surface des environnements côtiers de la mer de Beaufort ont été analysés pour définir leurs biofaciès actuels et faciliter l'interprétation des unités stratigraphiques de la plate-forme continentale. Les biofaciès modernes furent définis selon l'abondance relative de différents groupes écologiques, particulièrement des diatomées épipsammiques d'eaux saumâtres qui sont les plus abondantes. D'autres critères furent également utilisés, tels que le nombre d'espèces contenues dans les assemblages, la présence d'espèces diagnostiques et l'abondance relative des kystes de chrysophycées par rapport aux frustules de diatomées. L'analyse des assemblages a permis la mise au point d'une clé d'identification permettant la reconnaissance des environnements sédimentaires suivants dans les séquences stratigraphiques: A) Dans les milieux d'eau douce: les lacs de thermokarst, les lacs drainés et les étangs; B) En milieux saumâtres: les marais littoraux, les lacs partiellement ouverts par la transgression marine, les lacs ouverts formant des baies, les lacs ouverts subissant des apports d'eaux continentales, les lagunes et l'avant côte. Les biofaciès actuels mettent en évidence un gradient dans l'exposition des bassins aux processus côtiers, d'une circulation restreinte dans les lacs partiellement ouverts à une circulation plus intense dans les lagunes.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Mer de Beaufort.

**95-026 CARON, S. (1995).** Les cryofaciès et la dynamique d'un plateau de pergélisol au Détroit de Manitousuk, Hudsonie. Mémoire de maîtrise, Faculté des Lettres, Faculté des études supérieures, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

À l'intérieur d'une même butte ou d'un même plateau cryogène peuvent se côtoyer différents régimes thermiques et donc différentes évolutions géomorphologiques. Les séquences

stratigraphiques en regard du contenu de la glace dans le sol peuvent ainsi différer d'un régime à l'autre. Entre le 1er et le 16 août 1994, 25 forages effectués sur un même plateau de pergélisol et ce, dans différents contextes géomorphologiques (topographie, versants, rebord de falaise marine, zone de thermokarst), ont permis d'observer les cryofaciès dans la partie superficielle du pergélisol. La réalisation d'un forage, à l'aide d'un *Pionjär*, a de plus permis d'observer le pergélisol à de plus grandes profondeurs. La compilation et la corrélation entre les forages de la partie superficielle démontrent la présence de quatre couches récurrentes à plusieurs forages alors que le forage profond révèle la présence d'une couche riche en glace à la base du pergélisol. On retrouve ainsi une couche I, comprise entre 0 et 80 cm, correspondant au mollisol. La couche II, comprise entre 80 et 200 cm, correspond à un pergélisol riche en glace (50 à 80 pour-cent) et solide mécaniquement. La couche III, comprise entre 200 et 350 cm, correspond pour sa part à un pergélisol pauvre en glace (10 à 20 pour-cent) avec de fines veines et de fines lentilles dans les structures prismatiques originelles de l'argile. La couche IV, située entre 350 et 1400 cm, correspond à un pergélisol riche en glace (50 à 85 pour-cent) mais fragile mécaniquement. Enfin, la couche V, comprise entre 1400 et 1500 cm, correspond à une couche très riche en glace et du fait même à la base du pergélisol. Les aires du plateau en accroissement ont une couche II plus épaisse et plus riche en glace que les aires stagnantes ou en dégradation. Les aires en dégradation se caractérisent par une couche I épaisse et l'absence de la couche II; cependant le thermokarst y est ralenti par la présence de la couche IV riche en glace qui fond très lentement à cause du phénomène de chaleur latente.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Détroit de Manitousuk, Québec nordique.

**95-027 CARRIÈRE, S., GAUTHIER, G. et BROMLEY, R. (1995).** Spring feeding strategies of sympatric Canada and white-fronted geese nesting in the central Canadian Arctic. Paper, Eighth North American Arctic Goose Conference, Albuquerque, New Mexico, January 1995.

**ABSTRACT/DESCRIPTION:**

Spring feeding on the nesting ground is intensive in many Arctic-nesting populations of geese, significantly adding to the energy reserves necessary for laying and incubation. This study compares the spring feeding ecology of two species (*Anser albifrons albifrons* [WF] and *Branta canadensis hutchinsii* [CG]) on a shared nesting ground, near Walker Bay, Kent Peninsula, N.W.T., in 1993-1994. The pre-nesting period was divided into three parts according to snow-melt phenology: before melting (snow cover [sc] > 80 percent, 7-10 d), during (sc = 20-80 percent, 3-7 d), and after (sc < 20 percent, 5-7 d).

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Walker Bay, Kent Peninsula, N.W.T.

**95-028 CHOINIÈRE, L. and GAUTHIER, G. (1995).** “Energetics of reproduction in female and male greater snow geese”. Oecologia, 103:379-389.

**ABSTRACT/ DESCRIPTION:**

Arctic-nesting geese are classified as “capital” breeders (i.e., birds that rely largely on endogenous reserves to meet the high nutrient requirement of clutch formation) as opposed to “income” breeders (those that rely directly on ingested food). However, some evidence has suggested that energy reserves of greater snow geese (*Chen caerulescens atlantica*) are not sufficient to meet these costs. We tested whether greater snow geese were capital breeders and examined the consequences on their reproductive strategy. We collected 48 females and 47 males from arrival at the breeding colony on Bylot Island (N.W.T.) to the post-laying stage, and determined fat and protein content in somatic and reproductive tissues. §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-029 CLOUTIER, J. et FILION, L. (1995).** Analyse dendroécologique d’une frange forestière soumise à l’entourbement sur une île centrale du Lac Bienville, Québec subarctique. Rapport d’étude, 63ième Congrès de L’ACFAS, 22-26 mai, Université du Québec à Chicoutimi, Québec.

**RÉSUMÉ/ DESCRIPTION:**

Les îles centrales du lac Bienville, constituées de matériel fluvio-glaciaire, sont habituellement occupées par des pessières à lichens. Toutefois sur la façade ouest de quelques îles, on observe le développement de dépôts tourbeux, campés sur un substrat meuble bien drainé. L’accumulation différentielle de la tourbe en buttes, composée essentiellement de sphaignes (*Sphagnum nemoreum*), est en grande partie contrôlée par la distribution de épinettes noires (*Picea mariana* (Mill.) BSP.), qui favorisent des accumulations locales de neige importantes. L’analyse dendroécologique détaillée de trois arbres vivants dont la tige est entourbée à la base, révèle les réactions suivantes: 1) le développement d’un tronc en forme de fuseau 2) la détérioration du système racinaire originel et la formation de racines adventives 3) l’apparition d’anomalies dans la formation des cernes annuels (cernes incomplets et bourrelets de croissance associés à l’apparition des racines adventives) et 4) une réduction de la croissance radiale. La mortalité élevée des arbres au sein de ces franges forestières indique que seul un nombre limité de tiges survit à l’entourbement. En revanche, l’entourbement permet à la population d’épinettes noires de se maintenir. Les taux maximum d’accumulation de la tourbe, calculés à l’aide des racines adventives, varient de 0,34 à 0,45 cm/année.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec nordique.

**95-030 CLOUTIER, D. et HÉQUETTE, A. (1995).** Les effets des variations de viscosité de l'eau de mer sur les transports sédimentaires littoraux, Kuujjuaraapik, nouveau-Québec. Rapport d'étude, Colloque annuel, Centre d'études nordiques, Université Laval, 1 décembre 1995.

**RÉSUMÉ/DESCRIPTION:**

Le long de la plage de Poste-de-la-Baleine, les variations de la viscosité de l'eau sont causées par deux facteurs: 1) la proximité des eaux douces de la Grande-Rivière-de-la-Baleine; 2) la diminution des températures des eaux côtières suivant les diminutions saisonnières des températures de l'air. Les analyses des taux de transport des mois d'août et de novembre 1994, montrent une diminution des taux de transport avec l'augmentation de la viscosité cinématique des masses d'eau. Simultanément à cette augmentation de la viscosité, on observe un accroissement de la taille des particules transportées en suspension et sur le fond, pour des vitesses de courant longitudinal supérieures à  $0,15 \text{ m s}^{-1}$ . La vitesse du courant littoral engendré par les vagues doit être plus grande pour transporter des quantités similaires de sédiments lorsque la viscosité du fluide est élevée, ce qui indique que la remise en mouvement des sédiments par les vagues est plus difficile lorsque la viscosité du fluide est plus élevée. Le comportement du fluide varie avec la viscosité et cette variation semble avoir des effets importants sur l'hydrodynamique des vagues et sur les processus associés de mobilisation et de transport de sédiments.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Kuujjuaraapik, Québec nordique.

**95-031 CLOUTIER, D. et HÉQUETTE, A. (1995).** Influence des variations de la viscosité de l'eau sur les transports sédimentaires longitudinaux côtiers en milieu subarctique. Rapport d'étude, Centre d'études nordiques, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Une étude des transports sédimentaires sableux dans la zone de déferlement a été réalisée le long d'une plage subarctique, à Kuujjuaraapik, sur la côte est de la Baie d'Hudson. Des échantillons de sédiments ont été récoltés à l'avant-plage et des paramètres de vagues et des caractéristiques physiques de l'eau ont été mesurés pendant l'été et l'automne 1994. Les analyses de taux de transport sédimentaire montrent une diminution du transport avec l'augmentation de la viscosité cinématique de l'eau pour des vitesses orbitales équivalentes.

La taille moyenne des sables transportés le long de la côte tend également à diminuer avec l'augmentation de la viscosité pour des vitesses orbitales élevées (>1,5 m/sec). Ces résultats suggèrent que la haute viscosité qui caractérise les eaux froides rend plus difficile la mise en mouvement des sédiments.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Kuujjuaraapik, Québec nordique.

**95-032 DESPLAND, E. et HOULE, G. (1995).** Reproduction et croissance du pin gris à la limite Nord de sa répartition. Rapport d'étude, 63ième Congrès de L'ACFAS, 22-26 mai, Université du Québec à Chicoutimi, Québec.

**RÉSUMÉ/DESCRIPTION:**

L'existence de conflits au niveau de l'allocation de ressources entre les différentes fonctions d'un organisme est un postulat fondamental en écologie. L'importance des conflits entre la reproduction et la croissance chez les végétaux, et surtout chez les espèces ligneuses, est encore mal connue. Cette étude évalue, sur une période de 25 ans, la relation entre l'effort reproducteur et la croissance végétative d'une population de pin gris située dans la vallée de la Grande rivière de la Baleine (Québec nordique), et relie ces deux fonctions aux conditions climatiques locales. Plusieurs variables estimant la reproduction ont été mesurées à partir de cônes sérotineux produits entre 1969 et 1992: nombre de cônes et de graines, masse des graines et taux de germination. Ces variables montrent des différences selon la position dans l'arbre (hauteur et orientation) et selon l'année de production des cônes. Les variations inter annuelles au niveau de la reproduction et de la croissance semblent synchronisées entre les arbres. L'effort reproducteur est mis en relation avec la largeur du cerne de croissance, l'élongation du rameau, la précipitation et la température.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Grande-rivière-à-la-Baleine, Québec nordique.

**95-033 DESPLAND, E. (1995).** Reproduction et croissance du pin gris à la limite nord de sa répartition: influences climatiques et conflits d'allocation. Mémoire de maîtrise, Département de biologie, Faculté des sciences et de génie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Plusieurs variables estimant la reproduction ont été mesurées chez des pins gris (*Pinus banksiana* Lamb.) à partir de cônes sérotineux produits entre 1969 et 1992, à la limite septentrionale de l'espèce au Québec. Ces variables furent ensuite mises en relation avec les conditions climatiques locales et la croissance des individus. Le climat influence la croissance

et toutes les étapes de la reproduction; le succès reproducteur semble favorisé par des températures élevées pendant les trois saisons de croissance impliquées dans le développement des cônes. Une bonne croissance s'accompagne d'une faible initiation de cônes; cependant, croissance et investissement dans les cônes en maturation varient de pair. La croissance et la reproduction n'entreraient donc pas en conflit direct au niveau de l'allocation des ressources mais dépendraient plutôt toutes deux du climat: lors de saisons de croissance relativement chaudes et longues, l'investissement à la fois dans la reproduction et la croissance semble augmenter.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-034 DOUVILLE, C. (1995).** Étude dendrochronologique de la croissance de l'épinette noire associée à l'influence climatique du milieu, lac Bienville, Québec subarctique. Mémoire de baccalauréat, Faculté des lettres, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

La façade occidentale des îles du lac Bienville est soumise aux vents dominants d'ouest. Les franges forestières situées de ce côté subissent les contraintes de cette exposition. Conséquemment, ces arbres vont adopter des formes de croissance pour s'adapter aux stress qu'ils subissent. Les marges forestières composées principalement d'épinette noire (*Picea mariana* (Mill.) BSP), vont jouer un rôle protecteur pour les lisières forestières adjacentes en plus de favoriser l'accumulation de neige à cet endroit, stimulant pas l'humidité qu'elles fournissent la croissance de buttes de sphaignes. L'analyse tige de deux épinettes noires a permis de déceler certains symptômes reflétant l'état régressif de la frange forestière étudiée. Cette dégradation se manifeste par la mortalité des branches, la présence de lichens sur le feuillage mort, une baisse de croissance radiale récente en milieu très exposé et la colonisation des buttes de sphaignes par les lichens en raison du changement dans le régime nival local.

**DISCIPLINE:** Écologie/Sciences de l'environnement.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec nordique.

**95-035 FORTIER, M., FORTIER, L., LEBLANC, B. and LEGENDRE, L. (1995).** From ice algae to sediments in seasonally ice-covered Arctic seas: Contribution of direct cell sinking and zooplakton grazing to the vertical pigment flux. Presentation, 25<sup>th</sup> Arctic Workshop, Université Laval, Québec, March 1995.

**ABSTRACT/DESCRIPTION:**

Contribution of direct cell sinking and zooplankton grazing to the vertical flux of pigments under the ice cover of Resolute Passage was monitored from May 5th until ice breakup on July 11th 1994 using consecutive short-term deployments of sediment traps. Cell sinking and zooplankton grazing were assessed by measuring the vertical fluxes of chlorophyll *a* and phaeopigments. In May, less than 2 percent of the ice algae dominated chlorophyll standing stock was losted daily, grazing and direct sinking contributing equally to the flux of pigments. Early rain and thaw in late May resulted in the flushing and rapid sedimentation of ice algae, 30 percent of the standing stock of chlorophyll being recovered in the traps daily, mostly as ungrazed cells. In June, the scarcity of snow and ice algae induced an early bloom of slowly sinking phytoplankton during which 60 to 80 percent of the sinking material was in the form of zooplankton fecal pellets. Our results suggest that except for the period of release of rapidly sinking ice algae, the role of zooplankton grazing exceeds direct cell sinking in the vertical flux of pigmented particulate matter in seasonally ice covered seas of the Arctic.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Resolute Passage, N.W.T.

**95-036 FORTIER, M., FORTIER, L. and DEMERS, S. (1995).** Zooplankton and larval fish community development: comparative study under first-year sea ice at low and high latitudes in the northern hemisphere. Paper, NIPR Symposium on Polar Biology, January 1995, Tokyo, Japan.

**ABSTRACT/DESCRIPTION:**

We compared the development of the zooplankton community in relation to the ice-algal bloom in Saroma Ko lagoon and Resolute Passage in spring. In Saroma Ko, mysids and copepods were the dominant components of the zooplankton. Numerically, *Pseudocalanus* spp. represented more than 73 percent of the copepod assemblage. The constancy of *Pseudocalanus* stage composition and the low production of copepod eggs and nauplii indicated that ice algae in the lagoon did not stimulate the development of copepods in spring. During the sampling period, the colonization of Saroma Ko by larvae of several species of marine fish coincided with low production of zooplankton prey in the lagoon. In Resolute Passage, the hyperiid amphipod *Themisto libellula* and the copepod *Pseudocalanus acuspes* dominated the zooplankton. The population of *Pseudocalanus acuspes* (78 percent of the copepod assemblage) evolved from a majority of overwintering CIV and CV copepodites in early May to a majority of females in late June. The production of eggs and nauplii increased



over this period and started well before the massive release of ice algae or the phytoplankton bloom. This suggests that *Pseudocalanus acuspes* reproduction may be fuelled by endogenous reserves from the previous fall and/or the grazing of ice algae falling from the ice-cover. Few fish larvae were sampled in Resolute Passage, indicating that this area of strong advection is probably unsuitable for the reproduction of fish. Our results for Saroma Ko lagoon and Resolute Passage support the hypothesis that, in seasonally ice-covered seas, the importance of the ice-algal cycle to the maturation of *Pseudocalanus* increase with latitude.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Resolute Passage, N.W.T.

**95-037 FORTIN, D., LAROCHELLE, J. et GAUTHIER, G. (1995).** La thermorégulation comportementale chez les oisons de la grande oie des neiges. Présentation, 20ième Colloque annuel de la Société québécoise pour l'étude biologique du comportement, Montréal, Québec, novembre 1995.

**RÉSUMÉ/DESCRIPTION:**

En plus de la température de l'air, le vent et le rayonnement ont une influence majeure sur les échanges thermiques corps-environnement. L'objectif de cet étude est de déterminer si des ajustements comportementaux peuvent influencer les échanges thermiques avec l'environnement chez les oisons de la grande oie des neiges (*Chen caerulescens atlantica*) Nos résultats montrent d'abord qu'un oison se tenant debout, face à un vent de 5 m/s à 10°C, subira le même taux de pertes de chaleur que s'il se trouvait dans une enceinte sans vent et noire, à une température entre -8 et -13°C, dépendant de l'âge. Dans ce cas, la température environnementale telle que perçue par l'oison (et estimée par la température opérationnelle standard,  $T_{es}$ ) pourra quant à elle jusqu'à 23°C inférieure à celle de l'air. Une source de rayonnement de 500 W/m<sup>2</sup> peut, quant à elle, augmenter la  $T_{es}$  de 10 à 16°C. L'influence du vent et du rayonnement sur la  $T_{es}$  d'un oiseau varie de façon considérable selon son orientation. Un avantage thermique minimal est toutefois nécessaire pour induire une orientation systématique selon la position du soleil et la direction du vent. Comme indice de l'avantage thermique, nous avons utilisé la différence entre les  $T_{es}$  maximales et minimales que l'oison pouvait obtenir, simplement en changeant d'orientation. L'avantage nécessaire pour qu'il y ait thermorégulation comportementale varie selon que l'oison se trouve dans un environnement chaud ou froid et selon qu'il est assis ou debout. Par exemple, dans un environnement froid, un avantage thermique de 3°C est suffisant pour induire une orientation non-aléatoire vis-à-vis le soleil et le vent chez des oisons assis au sol. Par contre, s'ils sont debout, la différence doit être d'au moins 8°C pour qu'ils choisissent l'orientation offrant la  $T_{es}$  la plus élevée. Nos résultats démontrent que, dans leur milieu naturel, les oisons varient leur orientation selon le soleil et le vent dans le but de se "créer" un environnement thermique plus favorable.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-038 GAUTHIER, G., HUGHES, J.R., BEAULIEU, J., ROCHEFORT, L. and REED, A. (1995).** “Effect of grazing by greater snow geese on the production of graminoids at an Arctic site (Bylot Island, N.W.T.)”. *Journal of Ecology*, 83:653-664.

**ABSTRACT/DESCRIPTION:**

Arctic ecosystems are sensitive to grazing because of their low overall net primary production. We therefore studied the effect of greater snow geese on the production of Arctic graminoids. At Bylot Island, N.W.T. (73°N), breeding snow geese graze *Eriophorum scheuchzeri* and *Dupontia fisheri* in lowland polygon fens. Vegetation in seasonal exclosures was sampled at 2-week intervals from mid-June to mid-August 1990, 1991 and 1993 (ungrazed areas) and compared with plant growth in short-term exclosures set up over grazed areas. Standing crop (above-ground biomass), net above-ground primary production (NAPP) and nitrogen content were determined for both plant species. Goose faeces were used as an index of grazing intensity. On an individual plant basis, cumulative NAPP of *Dupontia*, but not of *Eriophorum*, was reduced by grazing. Nitrogen content of plants after grazing was higher than in ungrazed plants. Although grazed plants were able to grow new foliage, goose grazing did not enhance NAPP at Bylot Island as has been reported elsewhere. This could be either because grazing occurs too late in the season when the regrowth capacity of plants is low or because nutrients released from goose faeces are absorbed by mosses and are not immediately available to graminoids.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-039 GAUTHIER, G. and HUGHES, R.J. (1995).** “The palatability of Arctic willow for greater snow geese: the role of nutrients and deterring factors”. *Oecologia*, 103:390-392.

**ABSTRACT/ DESCRIPTION:**

Temporary feeding on willow buds and leaves by nesting greater snow geese provided us with an opportunity to test the relative importance of nutrients and deterrents in affecting the palatability for geese of a food plant with high phenol content. Protein, total phenol and fibre (neutral and acid detergent fibre, and lignin) were analysed in closed and open buds and in rolled and open leaves. Geese feed on willows at the open-buds and rolled-leaf stages but not at the closed-bud and open-leaf stages. Protein content was higher in open buds and rolled leaves (25-27 percent) than in closed buds and open leaves (19-21 percent). Phenol content increased during leaf emergence but was already high (14 percent) in rolled leaves. All plant

fibres were very high in closed buds but declined rapidly during leaf emergence. The increase in phenol: protein ration appeared to be more important than phenol concentration alone in explaining the cessation of feeding by geese on willow leaves whereas the high fibre content of closed buds may explain why they were not eaten. Our results illustrate the value of a multifactorial approach in the study of the food selection process in herbivores.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Canadian Arctic.

**95-040 GAUTHIER, G., LEPAGE, D. and REED, A. (1995).** Site infidelity in nesting greater snow geese. Paper, Eighth North American Arctic Goose Conference, Albuquerque, New Mexico, January 1995.

**ABSTRACT/DESCRIPTION:**

Breeding philopatry is well developed in female ducks and geese with birds often coming back to nest within a few meters of previous year nest site. However, over a 7-year period, we found a very low level of nest site fidelity in greater snow geese on Bylot Island, N.W.T. Here, we document this unusual behaviour and discuss the reasons for it. Nests were searched extensively during the laying period from 1988 to 1994 over a 65 km<sup>2</sup> area. <sup>2</sup> Š Although nesting in lowland areas may be the preferred strategy because of the abundant food available around the nest, upland nesting may be favoured in years of high predation (1994, a year after a peak in lemming abundance). Selection of a new nest site every year may be favoured over site fidelity because 1) of the high temporal and spatial variability in snow-melt and predation pressure in the high Arctic, and 2) the long feeding period that takes place between arrival and start of egg-laying provides enough time for nest site prospecting. In contrast to their flexibility in nest site selection, greater snow geese showed much less flexibility in their nest initiation date between years.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-041 GAUTHIER, G. et PIEDBOEUF, N. (1995).** La qualité nutritive des sites d'alimentation des oisons de la grande oie des neiges: est-il avantageux d'utiliser des sites déjà broutés? Présentation, 20ième Colloque annuel de la société biologique pour l'étude du comportement, Montréal, Québec, novembre 1995.

**RÉSUMÉ/DESCRIPTION:**

Le choix du site d'alimentation peut avoir une grande influence sur le taux d'ingestion et la digestibilité de la nourriture chez les oisons de la grande oie des neiges (*Chen caerulescens*

*atlantica*) durant la croissance. Les oisons ont généralement à choisir entre des sites non broutés où la biomasse est plus élevée mais la qualité plus faible et des sites broutés où la biomasse est plus faible mais la qualité plus élevée suite à la repousse. Nous avons donc comparé le taux d'ingestion et la digestibilité de la nourriture, le taux d'assimilation de l'azote et de l'énergie métabolisée entre des sites non-broutés et broutés chez des oisons captifs à l'Île Bylot (T.N.-O.) et examiné l'effet de la date d'éclosion (hâtive vs. tardive) sur ces variables. La digestibilité de la matière organique, de l'azote et de l'énergie de même que la prise alimentaire ont diminué au cours de la saison. Ceci s'explique par la très faible repousse à l'Île Bylot en 1994 à cause de conditions de sécheresse. La biomasse et la qualité nutritive étant toutes deux plus basses dans les sites broutés, les oisons n'ont pas eu un taux d'assimilation de l'azote et de l'énergie plus élevée dans ces sites. La prise alimentaire et l'assimilation de l'énergie augmentent jusqu'à l'âge de 11 jours et décroissent par la suite. Lors de saisons végétatives sèches comme celle de l'été 1994, il est peu avantageux pour un oison de se nourrir sur des sites broutés en repousse et encore moins d'éclore tard.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Île Bylot, T.N.-O.

**95-042 KASPER, J.N. (1995).** Geomorphic, geophysical and quaternary studies of ice and soil wedge features in the Foucault River Valley, northern Québec. Ph.D. Thesis Report, Department of Geography, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

In the Foucault River valley on the south coast of the Hudson Strait, geomorphic, stratigraphic and periglacial evidence was collected to determine the post-glacial evolution of the valley, including the determination of periods of the Holocene favourable for the establishment and growth of ice wedge polygonal networks. Evidence of glaciation was collected in the form of indicators of direction of ice flow (north to northwestward flow) and the location of glaciogenic deposits. With the disintegration of the inlandis, a marine transgression followed, with a maximum recorded sea level of 147 m at the valley mouth. Radiocarbon dates from fossilized marine shells attest to the occupation by the sea from 7600 to 4800 BP. Coincident with a slowly dropping sea level was the formation of various terrace levels along the river. These terraces have sedimentary sequences which evolve down towards the mouth of the river, exhibiting characteristics ranging from parts of a delta, through shallow water cross-bedding features. As the terraces emerged from the river, climatic conditions allowed the establishment of permafrost. Vegetation was slow to colonize these terraces, and aeolian conditions dominated for long periods of time. In keeping with the periglacial climate, ice wedge networks began to grow starting from frost fissures on the newly emergent surfaces. These networks have persisted through at least 5 subsequent climatic periods (2 warm and 3 cold phases). These periods are recorded in the sedimentary deposits surrounding the various ice wedges. The current climatic phase is a cold phase of

growth, seen by the multiple stages topping many of the ice wedges studied herein.

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Northern Québec.

**95-043 KINNARD, N. (1995).** La croissance du pin gris et de l'épinette noire en Jamésie. Mémoire de baccalauréat, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

L'objet de la dendrochronologie est la datation des cernes annuels de croissance des plantes ligneuses qui permet par la suite la construction de séries dendrochronologiques de référence. La dendrochronologie est utilisée, entre autres, comme outil dans la reconstitution du climat passé et dans la compréhension des problèmes de croissance des essences forestières. Depuis la création du complexe La Grande, en Jamésie, plusieurs études ont été menées afin de déterminer l'impact de la mise en eau des réservoirs. Les espèces caractéristiques de la région, le pin gris et l'épinette noire, subissent en effet des fluctuations de croissance comme le démontre cette étude. De plus, plusieurs types de cernes diagnostiques ont été détectés. Quatre sites, dont trois sont situés aux abords de la baie de James, ont été étudiés afin de comprendre et de déterminer l'origine des chutes de croissance des deux espèces. La dendrochronologie permettra d'isoler les facteurs locaux (effets des réservoirs) des facteurs régionaux (climat) et d'autres facteurs (infestations d'insectes, feu). Les séries de référence et les chronologies des cernes diagnostiques seront comparées aux données climatiques afin d'explorer l'hypothèse d'un effet possible des réservoirs du complexe La Grande.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-044 LABERGE, M.J. and PAYETTE, S. (1995).** "Long-term monitoring of permafrost change in a palsa peatland in northern Québec". Arctic and Alpine Research, 27 (2):167-171.

**ABSTRACT/ DESCRIPTION:**

Changes in the spatial distribution of permafrost in the Ouatouchouane palsas peatland (northern Québec) were monitored from 1957 to present, using aerial photographs taken in 1957 (starting date) and three field surveys in 1973, 1983, and 1993, respectively. Between 1983 and 1993, palsas degradation occurred at about the same rate as between 1957 and 1983, although minor differences in rate of permafrost decay during the three periods (1957-1973, 1972-1983, 1983-1993) may be attributed in part to misidentification of marginal permafrost landforms. Permafrost degradation appeared to be influenced by height of individual palsas and

their location within the peatland. Since 1983, thermokarst ponds have been progressively invaded by sedges and *Sphagnum*, a situation promoting successional peatland development and palsa formation as suggested by the presence of a small incipient palsa. Although the main geomorphic process at work is palsa degradation, permafrost aggradation is possible under present climatic conditions.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**95-045 LADANYI, B., FORTIER, R. et ALLARD, M. (1995).** Mesure in situ des propriétés physiques d'un pergélisol silteux par une utilisation simultanée des méthodes géotechniques et géophysiques. Rapport, 8ième Congrès annuel de l'Association professionnelle des géologues et des géophysiciens du Québec, Université Laval, 19-21 avril 1995.

**RÉSUMÉ/DESCRIPTION:**

Une campagne d'essais de pénétration au cône et de diagraphies de résistivité électrique a été réalisée sur une butte minérale de pergélisol à Kangiqsualujjuak au Nunavik, Québec, lors de la période de dégel du printemps 1992. Le principal objectif de ce projet de recherche était non seulement d'évaluer les effets de la variation de la température de pergélisol sur ses propriétés physiques (la teneur en eau non gelée, la résistance mécanique et la résistivité électrique), mais également de vérifier si une corrélation distincte existe entre les propriétés mécaniques et électriques d'un sol gelé. La méthodologie adoptée sur le terrain englobait la réalisation sur une base hebdomadaire d'un carottage dans le pergélisol, de diagraphies de résistivité électrique et de température, et d'une série de quatre essais rapprochés de pénétration au cône. §

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Kangiqsualujjuak, Québec nordique.

**95-046 LAURION, I., VINCENT, W.F., and LEAN, D.R.S. (1995).** Spectral Attenuation of solar UV radiation in high latitude lakes. Paper, 25th Arctic Workshop, Université Laval, Québec, March 16-18, 1995.

**ABSTRACT/DESCRIPTION:**

The striking non-linear relationship between biological effect and wavelength in the UV region of the solar spectrum led us to search for a more accurate definition of spectral attenuation of UV light in the upper layer of lakes. Previous studies have shown that spectral absorbency varies according to the relationship:  $a(\bullet) = a_0 e^{-S\bullet}$ . The slope  $S$  is often within the

narrow range 0.013-0.016 nm<sup>-1</sup>, while a<sub>0</sub> changes greatly between waters of different DOC content. We studied the spectral attenuation of UV in Arctic and subarctic lakes to determine whether the “quasi-inherent” optical parameter K<sub>d</sub> (diffuse attenuation coefficient) followed a similar relationship: K<sub>d</sub>(•)=K<sub>0</sub> e<sup>-S•</sup>. Š

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**95-047 LAVOIE, C. et PAYETTE, S. (1995).** “Analyse macrofossile d’une palse subarctique, Québec nordique”. Canadian Journal of Botany, 73:527-537.

**RÉSUMÉ/DESCRIPTION:**

Une palse d’une tourbière subarctique localisée à proximité de la limite nord-ouest des forêts au Québec (57° 45' de latitude nord, 76° 14' de longitude ouest) a fait l’objet d’une analyse macrofossile recensant à la fois les macrorestes de plantes vasculaires, de bryophytes, de champignons mycorhizateurs, de bryozoaires, de cladocères et de coléoptères. Cette analyse avait pour but de décrire les stades de développement d’une vieille tourbière à paises et d’y trouver des indices de la présence de l’épinette noire (*Picea mariana*) antérieurs à 4560 Av. P., c’est-à-dire avant l’arrivée présumée de l’espèce dans la région d’étude, à la suite de la déglaciation. L’analyse montre que la tourbière formait, à ses débuts (de 5850 à 4500 Av. P.), un fen constitué de plusieurs petits étangs peu profonds. La flore était principalement composée de taxa aquatiques (*Ranunculus trichophyllus*, *Potamogeton* spp., *Hippuris vulgaris*). Vers 4500 Av. P., la tourbière s’est transformée en fen de Cyperacea. Le milieu est devenu moins humide et on trouvait, à cette époque, des taxa caractéristiques de fens pauvres (*Potentilla palustris*, *Menyanthes trifoliata*). Entre 3700 et 1950 Av. P., la quasi-totalité des macrorestes trouvés étaient des fragments de bois de *Betula glandulosa*. La palse s’est formée après 1950 Av. P. Cette tourbière à paises a un développement similaire à celui observé ailleurs au Québec subarctique, sauf qu’elle est caractérisée par la présence d’une épaisse tourbe ligneuse constitué presque exclusivement de fragments de *Betula glandulosa*. Les résultats ont révélé l’absence de macrorestes d’épinette noire antérieurs à 4560 Av. P. Trois pics d’abondance de macrorestes de coléoptères ont été recensés vers 4400, 3800 et 2700 Av. P. La plupart des taxa de coléoptères étant hygrophiles, il n’a pas été possible d’inférer des changements dans la structure de la tourbière à l’aide de leurs macrorestes.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-048 LEPAGE, D., GAUTHIER, G. and DESROCHERS, A. (1995).** Clutch manipulation in greater snow geese: the causal relationship between hatch date, brood size and pre-

fledging growth. Paper, Eighth North American Arctic Goose Conference, Albuquerque, New Mexico, January 1995.

**ABSTRACT/DESCRIPTION:**

Hatch date and brood size are two factors affecting gosling pre-fledging growth and survival in Arctic-nesting geese. However, studies conducted so far have not been able to separate the relative importance of parental phenotypic traits (e.g., intrinsic quality, age, breeding experience) and of factors extrinsic to parents (food availability and quality, social dominance of larger broods) in affecting gosling growth. For instance, the hatch date effect on growth rate has usually been explained by the seasonal decline in food availability or quality, but early nesting birds may also adopt a better habitat use strategy with their brood than late nesting ones. We manipulated greater snow goose (*Chen caerulescens atlantica*) clutches ( $n = 318$  nests) on Bylot Island (N.W.T.) to determine the contribution of parental phenotype in explaining variability in gosling growth. We conducted 2 clutch exchange experiments in 1993 and 1994: (1) between paired early-late nests (hatch date increased or decreased by 4 days), and (2) between paired small-large clutches (addition or removal of 2 eggs). §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-049 LEPAGE, H. and BÉGIN, Y. (1995).** Dendrochronological analysis of extreme water levels at lake Bienville, Subarctic Québec. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

The episodes of geomorphic activity associated with spring high lake levels were dated at lake Bienville, using various dendroecological indicators. Trees lying in upper shore positions were destabilized by wave erosion and their subsequent reaction, such as reaction wood, branches layering and apical relaying by adventitious lateral axes, allow to date the geomorphic events. Trees were established during favorable episodes in the 19th century, but were deeply destabilized since 1880. Major disturbances occurred in 1880, 1936, 1948, 1959, 1974 and 1979. The age structure of shoreline shrubs indicates periods of colonization during which relative low levels should have occurred, leaving momentarily stable up shore habitats favorable for shrub population expansion, especially during the decades of 1950s and 1980s. Postulated periods of shoreline geomorphic activity as shown by dendrochronological indicators are also supported by the gauged water levels register starting in 1974. Following high waters in the late 1970s, the 1980s were characterized by much lower spring levels. The results lead to the hypothesis of an increase in interannual fluctuations in early winter snow precipitations associated with much unstable atmospheric circulation in the Subarctic.

**DISCIPLINE:** Biology.



**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-050 LESAGE, L. and GAUTHIER, G. (1995).** Effect of hatch date and brood-rearing site on growth pattern and organ development in greater snow geese. Paper, Eighth North American Arctic Goose Conference, Albuquerque, New Mexico, January 1995.

**ABSTRACT/DESCRIPTION:**

Growth rate in geese is among the fastest of all precocial birds and appears to be especially sensitive to the feeding conditions encountered during the brood-rearing period. A general observation is that late-hatched goslings grow at a smaller rate than early-hatched goslings. In this study, we evaluated if late-hatched goslings adjusted their growth pattern to compensate for their slower growth rate compared to early-hatched goslings in greater snow geese (*Chen caerulescens atlantica*). We collected 48 early-hatched (EH, mean age = 42.4 d) and 48 late-hatched goslings (LH, mean age = 34.8 d) separated equally among sexes in 4 banding drives conducted in different areas on Bylot Island, N.W.T., in August 1993. §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-051 MANSEAU, M. and HUOT, J. (1995).** Effects of simulated browsing by caribou on biomass and quality of leaf tissue in two shrub species: *Vaccinium uliginosum* and *Betula glandulosa*. Research Report, Departement of Biology, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

Results are reported on the effects of simulated caribou browsing (removal of leaves and terminal buds) on the plant productivity and quality of two shrub species that are major components of the animal's diet during the summer months; *Betula glandulosa* and *Vaccinium uliginosum*. More precisely, we tested for the effects of 1) varying intensity and 2) timing of browsing on the productivity and quality of leaves in the current and subsequent year after browsing. In light of the source-sink hypothesis, we predict that when herbivores removes source and sink parts of a plant, the deteriorative effects of leaves removal would counter the ameliorative effect of buds removal and would have little effects on quality and productivity of food plants. We could also predict that the effect of early defoliation, in removing a source part of the plant early in the summer, would have a more pronounced counter effect than late defoliation treatments. Results did not support the prediction, browsing had negative effects on biomass and productivity in the current growing season as well as in the second growing season. In terms of tissue quality, the nitrogen content slightly decreased and other constituents (Fibres, total phenolics and tannins) did not differ significantly.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Kangiqsualujjuaq, Northern Québec.

**95-052 MANSEAU, M. and HUOT, J. (1995).** Effects of aggregation density on foraging efficiency of a gregarious ungulate: the caribou. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

This study investigated the effect of aggregation densities on the foraging efficiency of lactating caribou in the pre-insect season, June and July 1992, 1993. We measured activity budgets and habitat use in the Rivière George caribou (*Rangifer tarandus*) for different group densities. Aggregation density was negatively correlated to time spent feeding and to residence time at a feeding site. In mid-July, animals in tight aggregations (> 200 caribou/km<sup>2</sup>) spent 25 percent of their daily activity feeding compared to 50 percent for solitary animals (< 40 caribou/km<sup>2</sup>) and loose aggregations (between 40 and 200 caribou/km<sup>2</sup>). The reduced proportion of time spent feeding was associated with an increased proportion of time spent walking. Vigilance, alert-alarm and aggressive activities accounted for less than 0.1 percent of the time for all group densities. Animals in loose and tight aggregations were observed on the more productive parts of the range and demonstrated a higher selectivity towards high quality habitats, stands of dwarf birch (*Betula glandulosa*), at site level. In the pre-insect season, aggregation benefited animals through a higher access to high-quality habitats. Non-aggressive interference, however, occurred between animals in tight aggregations and significantly reduced their energy intake to a level comparable to the level induced by insects' disturbance.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-053 MARION, J., FILION, L. and HÉTU, B. (1995).** The Holocene development of a debris slope in subarctic Québec, Canada. Research Paper, Department of Geography, Université Laval.

**ABSTRACT/DESCRIPTION:**

The development of a debris-covered slope in subarctic Québec was reconstructed in relation to vegetation dynamics, fire history and local permafrost evolution. The slope consisted of a low-elevation rockwall and a rockwall-derived debris veneer overlying a sandy till deposit reworked by gelifuction. The sedimentological and stratigraphical data along with radiocarbon dating and dendroecological data indicated that: (1) the period around 5050 BP corresponded to the initial establishment of the forest cover probably after paraglacial rockfall activity

following deglaciation; (2) it was followed by a period of stability until c. 3200-3000 BP when gelification occurred; (3) the period between c. 300 BP and 900 BP was one of relative stability; (4) a series of fires after 900 BP initiated a period of destabilization by mass movements and surficial weathering processes; (5) local permafrost formed during the last few centuries, especially under the forest fringe where Sphagnum peat developed. Results from this study indicate a strong connection between fire, slope destabilization and the intensification of geomorphological slope processes during the last millennium at the study site.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northern Québec.

**95-054 MÉNARD, E., ALLARD, M. and MICHAUD, Y. (1995).** Influence of surface conditions on the distribution of permafrost near Manitounuk Sound, Hudson Bay (Québec). Paper, Frozen Ground Workshop, International Permafrost Association, December, 1995, Hanover, U.S.A.

**ABSTRACT/DESCRIPTION:**

On a regional scale, precise cartography of the permafrost must be based on a thorough knowledge of the surficial formations, geomorphologic indicators of permafrost and the vegetation-relief-snow-permafrost relations. The influence of every one of these variables may be analysed on a spatial basis, in order to explain the dynamics of the zones affected by permafrost. The objective of this study is to define the role of surface conditions on the distribution of permafrost. The site chosen for the study is in the discontinuous permafrost zone, characterized by a forest tundra vegetation. It is a strip of land 35 km long by 2 km wide located on eastern edge of Manitounuk sound, about 30 km northeast of the village of Whapmagoostui-Kuujuaraapik (latitude 55° 28' N). The width of the strip covers the entire low terrace right up to the gneissic granite ridges. Four variables (topography, surficial formations, snow cover and vegetal cover) were mapped and numerized into a spatial reference model in order to analyse their role as control agents of distribution of permafrost. The information layers were superposed and analysed quantitatively, which allowed a classification based on the conjunction of these phenomena. A map of the distribution of permafrost obtained by photo interpretation and fieldwork and the one obtained with model could then be compared. §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Manitounuk Sound, Hudson Bay, Québec.

**95-055 MENU, S., GAUTHIER, G. et REED, A. (1995).** La survie des jeunes de la grande oie

des neiges (*Chen caerulescens atlantica*) pendant la migration automnale. Rapport d'étude, Département de biologie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

La survie est un paramètre essentiel à la compréhension de la dynamique d'une population animale et des pressions de sélection auxquelles elle est soumise. La grande oie des neiges entreprend deux fois par an une migration de près de 4000 km entre son aire de nidification dans l'est du haut-Arctique et ses sites d'hivernage sur la côte atlantique des États-Unis. Dans l'Arctique, les oisons disposent d'un temps très court pour achever leur croissance avant de migrer. La survie des jeunes pendant la migration automnale a été déterminée par l'observation des familles dont la femelle était marquée avec un collier. Une taille moyenne de famille est ainsi estimée à la fin de l'été à l'Île Bylot (T.N.-O.) et à l'automne dans l'estuaire du St-Laurent (après que l'essentiel de la migration (3000 km) soit complété). Il existe une grande variation annuelle: 8 pour-cent de survie en 1994 contre 42 pour-cent en 1995. Cela pourrait s'expliquer par la condition corporelle des jeunes à la fin de l'été, les dates d'éclosion et les conditions météorologiques rencontrées pendant la migration.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Île Bylot, T.N.-O.

**95-056 MORNEAU, C. et PAYETTE, S. (1995).** Analyse dendroécologique de l'activité du caribou et perturbation de la végétation dans le nord-est du Québec-Labrador. Rapport d'étude, 63ième congrès de l'ACFAS, 22-26 mai 1995, Chicoutimi, Québec.

**RÉSUMÉ/DESCRIPTION:**

L'expansion récente du troupeau de caribou de la Rivière George a entraîné la perturbation du couvert végétal d'une vaste région dans le nord-est du Québec-Labrador. La séquence spatio-temporelle des changements de végétation associée au broutement et au piétinement par le caribou est évaluée à l'aide d'une approche dendroécologique qui permet de documenter l'historique de la fréquentation du milieu par le caribou. La cartographie de la végétation lichénique le long de transects aériens a permis de définir 4 zones de végétation (ca 80 000km<sup>2</sup>) réparties le long d'un gradient de sévérité de la perturbation par le caribou. Les sites bien drainés de la zone la plus perturbée sont en phase initiale de recolonisation par le lichen alors que ceux de la zone la moins perturbée sont dominés par un tapis de lichens bien développé. Le patron spatio-temporel de fréquentation de la région par le caribou est évalué grâce aux cicatrices de piétinement qui se forment sur les racines et les tiges superficielles des conifères lors du passage des caribous. L'analyse des distributions de fréquence de l'âge des cicatrices provenant d'une quarantaine de sites, indique que la fréquence par le caribou a augmenté à partir du milieu et la fin des années 1980 et ce, dans l'ensemble de la région où le couvert végétal est fortement perturbé.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Rivière George, Québec.

**95-057 MORNEAU, C. and PAYETTE, S. (1995).** Caribou activity from tree rings and disturbed vegetation in northeastern Québec-Labrador. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

This study documents past caribou activity from tree rings and evaluates the spatiotemporal pattern of disturbed vegetation on the traditional summer range of the Rivière George herd in northeastern Québec-Labrador. The region is characterized by a steep gradient of lichen abundance on well-drained sites. The area where lichen communities were most affected by caribou grazing and trampling covers at least 60 000 km<sup>2</sup>. Five vegetation zones were identified along a gradient of caribou disturbance. Lightly grazed vegetation is dominated by well developed *Cladina stellaris* mats, while the most disturbed zone is in an initial colonization stage by lichen. Past caribou activity was documented using trampling scars formed on exposed conifer roots and stems in caribou paths. The spatiotemporal pattern of caribou activity was evaluated by examining the age frequency of trampling scars at 35 open spruce stands. The analysis of scarage data suggests that increased caribou activity started in the mid-1970s and peaked in the mid and late-1980s over most of the disturbed area. It also indicates distinct regional patterns of caribou activity within the study area since 1960.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Rivière George, Northern Québec.

**95-058 OUELLON, M.P., RUZ, M.H., et HÉQUETTE, A. (1995).** Environnements littoraux holocènes le long d'une côte en émergence rapide, détroit de Manitousuk, Baie d'Hudson. Rapport d'étude, 63ième congrès de l'ACFAS, 22-26 mai 1995, Chicoutimi, Québec.

**RÉSUMÉ/DESCRIPTION:**

La région du détroit de Manitousuk est affectée par une émergence rapide des terres, résultant du réajustement glacio-isostatique post-glaciaire dans cette région. Au fur et à mesure de l'émergence, des rivages se sont mis en place et l'objectif de cette étude est de retracer l'évolution de la dynamique littorale pendant l'émergence Holocène. Les observations effectuées sur le terrain ont mis en évidence 3 types de côtes: une côte rocheuse très découpée caractérisée par des accumulations de blocs, une côte sableuse plus régulière et une côte de sédiments fins qui s'étend jusqu' au littoral actuel. La cartographie des littoraux à différentes périodes, définies à partir des courbes d'émergence, ainsi que l'analyse de plusieurs

coupes stratigraphiques, ont permis de constater que l'énergie des vagues disponible lors de la régression a influencé les faciès superficiels et profonds. À certains endroits, le passage de plusieurs feux ont remanié les dépôts sableux en dune paraboliques. Mais ce remaniement éolien n'a été que superficiel.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Détroit de Manitousuk, Québec nordique.

**95-059 RAE, R. et VINCENT, W.F. (1995).** La température: un facteur important pour le réseau alimentaire microbien dans les environnements d'eau douce nordiques. Rapport d'étude, Département de biologie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Les basses températures caractérisent les eaux douces nordiques. Des études récentes ont montré que plusieurs environnements aquatiques dans le Subarctique sont dominés par le réseau alimentaire microbien. La température joue un rôle important pour tous les organismes aquatiques, mais les effets de celle-ci sur le réseau alimentaire microbien ne sont pas encore très bien connus. Notre recherche se concentre sur les hypothèses des effets différentiels de la température sur un ensemble varié de micro-organismes tels que les bactéries, les picocyanobactéries et les nanoflagellés. Des expériences à court terme et à moyen terme ont été faites dans le but d'observer des changements dans la communauté microbienne. Les résultats suggèrent que les influences de la température sur les organismes autotrophes sont importantes sur une échelle de 2 jours, mais après 6 jours la température devient moins importante. Les expériences de photosynthèse montrent une augmentation de la capacité photosynthétique et de la photo inhibition avec une diminution de la température. Les effets de basses températures pourraient avoir une influence importante de récupération cellulaire chez les micro-organismes, subissant les dommages d'une augmentation de la radiation ultraviolette.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Subarctique.

**95-060 RICARD, B. (1995).** Analyse des anomalies de croissance du sapin baumier et de l'épinette blanche dans diverses localités du Québec-Labrador. Mémoire de baccalauréat, Faculté des lettres, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

La collection Gardner renferme une vaste série d'échantillons qui sont, pour la plupart, des

sections transversales d'arbres prélevées dans diverses régions du nord-est de l'Amérique. La présente étude vise à illustrer la réponse du sapin baumier et de l'épinette blanche à des événements climatiques régionaux. À l'aide d'une analyse dendrochronologique, il a été possible de distinguer des cernes diagnostiques sur chacun des échantillons retenus et d'en établir leur chronologie. Une analyse de la croissance radiale pour les deux espèces a été produite, puis mise en relation avec les données précédentes. Les individus étudiés présentent des patrons de croissance marqués par une diminution de la production ligneuse durant certaines périodes.

**DISCIPLINE:** Géographie physique

**LIEU DU TRAVAIL SUR LE TERRAIN:** Labrador.

**95-061 ROBERGE, M. et HILL, P. (1995).** Étude morpho-sédimentaire d'un delta en milieu de régression forcée, Grande-Rivière-à-la-Baleine, Baie d'Hudson. Rapport, Colloque annuel, Centre d'études nordiques, Université Laval, 1 décembre 1995.

**RÉSUMÉ/DESCRIPTION:**

Des réservoirs pétrolifères sont fréquemment associés aux systèmes deltaïques. Plusieurs études ont donc été entreprises pour comprendre la stratigraphie interne ainsi que les processus responsables des schémas de transport et de dépôt de ces corps sédimentaires. Des efforts sont faits pour établir des modèles qui relient la morphologie, la structure interne des dépôts et la localisation d'éventuels réservoirs. La présente étude vise à établir un modèle de dépôt pour un delta en milieu de régression forcée. Le delta moderne étudié est celui de la Grande-Rivière-à-la-Baleine, située sur la côte est de la Baie d'Hudson, où le relèvement isostatique est encore d'environ 1 cm/an. La partie sub-aérienne du delta consiste en un complexe de dunes et une plage sableuse. La morphologie de la partie sous-marine, basée sur des relevés d'écho-sondeur et de réflexion sismique, peut être divisée en trois grandes parties, soit: une plate-forme deltaïque qui semble être une zone de contournement sédimentaire, le talus deltaïque marqué par la progradation du pro-delta et le bassin où les sédiments déposés par suspension épousent la topographie du fond. De chaque côté de la rivière, on retrouve des grandes coupes représentant le passage du pro-delta aux dunes qui permettent de voir la succession des faciès sédimentaires. La morphologie générale couplée au modèle de faciès, donne un aperçu bi-dimensionnel des dépôts. Il reste à regarder l'étalement et la géométrie des différents corps sédimentaires (3D). Ceci sera réalisé par l'étude des discontinuités des réflecteurs sur les relevés sismiques à haute résolution.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Grande-Rivière-à-la-Baleine, Baie d'Hudson.

**95-062 ROUSSEAU, L. et ALLARD, M. (1995).** Étude stratigraphique de paises et de plateaux palsiques en milieu de pergélisol discontinu. Rapport d'étude, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Cette étude a été réalisée dans la région de la rivière Boniface (57°45' N, 76°15' W) dans le nord du Québec, en zone de pergélisol discontinu. On y retrouve deux types de formes de la famille des paises: 1- des paises hautes (jusqu'à 10 m), de forme circulaire, disposées en chapelet dans des vallées rocheuses encaissées; 2- des plateaux palsiques bas (environ 1 m), principalement disposés dans des vallées évasées entre des drumlins. Un des buts de l'étude est d'expliquer l'origine des différences géomorphologiques entre les deux types de formes. Des séries de forages selon des transects transversaux et longitudinaux révèlent que la hauteur des paises et des plateaux palsiques dépend de la présence de couches plus ou moins épaisses de sédiments marins silteux sous la tourbe, dans lesquels se forment des lentilles de glace de ségrégation. Sous les paises, les silts argileux, riches en glace, dépassent 17 m d'épaisseur alors qu'ils n'atteignent pas 3 mètres sous les plateaux palsiques. Du fait de leurs fortes pentes, les paises présentent une répartition très irrégulière de la couche de tourbe, tandis que les plateaux palsiques présentent une couche de tourbe d'épaisseur uniforme. §

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Rivière Boniface, Québec nordique.

**95-063 ROY, A.P. and BÉGIN, Y. (1995).** Distribution of shoreline vegetation at Lake Bienville, subarctic Québec. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

A cursory aerial survey of the shoreline of this major subarctic lake in Québec made certain characteristics abundantly clear: 1- Cold climate geomorphic processes are at work here, as demonstrated by sorted circles and drift ice phenomena.; 2- Floristic composition, density and cover vary greatly from one section of the shoreline to the next; 3- While coarse zonation gradients can be identified, much of the shoreline vegetation appears as a mosaic of structurally differentiated patches. In this paper, we will focus on the shoreline vegetation patterns at the 1:5000 cartographic scale. Various geomorphic agents leave evidence of their action, the extent of which can also be mapped realistically at that scale. The study aims to clarify the relationship between the coarse patterning of the vegetation and the action of the geomorphic agents, as measured at the 1:5000 scale. Microtopographic variations are important, but they have to be viewed as noise at the 1:5000 scale. They will be the subject of a subsequent paper. §

**DISCIPLINE:** Physical Geography.



**FIELDWORK LOCATION:** Lake Bienville, Northern Québec.

**95-064 TREMBLAY, M. (1995).** Reconstitution des anomalies de croissance du mélèze larcin (*Larix laricina* (Du Roi) K. Koch) dans différentes régions du Québec-Labrador. Mémoire de baccalauréat, Faculté des lettres, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Entre les années 1930 et 1970, le botaniste G. Gardner a monté une collection de sections transversales de mélèze larcin (*Larix laricina* (Du Roi) K. Koch) provenant de ses itinéraires botaniques dans l'ensemble du Québec-Labrador. Ce mémoire aura donc pour but d'exploiter cette collection afin d'évaluer son potentiel pour l'élaboration de futurs travaux de dendroécologie. La datation des anomalies de croissance mise en relation avec les périodes épidémiques déjà définies par la littérature permettent de noter la présence d'infestations de la tenthrède du mélèze (*Pristiphora erichsonii* (Hartig)). L'analyse des cernes perturbés et des séries dendrochronologiques rendent indéniable la présence de manifestations régionales d'insectes phytophages dans l'ensemble du Québec-Labrador. La collection gardner semble avoir un haut potentiel pour une reconstitution spatio-temporelle de la tenthrède du mélèze sur le territoire du Québec-Labrador.

**DISCIPLINE:** Écologie/Sciences de l'environnement

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique-Labrador.

**95-065 TREMBLAY, J.-P., GAUTHIER, G., LEPAGE, D. and DESROCHERS, A. (1995).** Relationship between nest site characteristics and nesting success in greater snow geese. Paper, Eighth North American Arctic Goose Conference, Albuquerque, New Mexico, January 1995.

**ABSTRACT/DESCRIPTION:**

Nesting success is an important fitness component in Arctic-nesting geese and may be greatly influenced by nest site characteristics. Because greater snow geese (*Chen caerulescens atlantica*) showed a high annual and temporal variability in mere selection of nest sites, we examined the relationship between nest site characteristics and nesting success at the Bylot Island, N.W.T., colony. Predation by Arctic fox (*Alopex lagopus*) was the main cause of nest failure. Nests of the main colony found in 1993 ( $n = 220$ ) were monitored from the end of laying until hatching. Nests were mapped with a GPS receiver. Nest density averaged 4.2 nests/ha. The colony was clustered around a snowy owl (*Nyctea scandiaca*) nest, the arithmetic center of the colony being only 66 m away from the owl's nest. There was a weak but significant relationship between start of egg-laying and distance from the owl's nest, but no relationship with clutch size. Nesting success declined with distance from the owl's nest

but this may have been confounded by nest density which also declined from distance to owl's nest. Habitat and microhabitat characteristics of each nest were sampled after hatching. Nesting success was lower in areas with a high density of ponds but sample size was small ( $n = 15$  nests). Vegetation or micro-topography around the nest site was not associated with success. Nesting success was high in 1993 (89 percent) compared to previous years (74 percent, average 1989-92), possibly because of the predator-free area maintained by the owl around its nest, and may account for the lack of relationship between nesting success and nest site characteristics. The same data were collected on a larger sample of nests ( $n = 305$ ) and a greater diversity of habitats in 1994, a year without nesting owls but with a high density of foxes. Under such conditions, nesting success dropped to 41 percent. This should help us to better evaluate the effect of nest site characteristics per se on nesting success.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-066 VÉZINA, S. and VINCENT, W. F. (1995).** Phytotoadaptive strategies of freshwater cyanobacteria from an Arctic environment: Bylot Island, N.W.T. Research Report, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

The Arctic is considered an extreme environment due to its cold climate and short growing season. On Bylot Island, cyanobacteria are amongst the most abundant groups of organisms present in the microbial community of tundra lakes and ponds. Filamentous species form mats of up to a few centimetres thick that cover the bottom substrata. Small unicellular species (picoplankton), are a major component of the phytoplankton community in these high latitude waters. Two strains of Arctic cyanobacteria were brought into culture to investigate their strategies of photoadaptation. Physiological responses were measured under a gradient of irradiances as would be experienced in the microbial mat regime, for example. The photoadaptive kinetics of these two strains were investigated in cultures exposed to changes in the light regime, as would be experienced, for example, during water column stratification and mixing, or during lake ice formation and melting.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**95-067 LAURION, I., DEMERS, S. and VÉZINA, A.F. (1995).** “The microbial food web associated with the ice algal assemblage: biomass and bacterivory of nanoflagellate protozoans in Resolute Passage (High Canadian Arctic)”. Marine Ecology Progress Series, 120:77-87.

**ABSTRACT/ DESCRIPTION:**

Biomass and grazing activity of sea ice microorganisms smaller than 20  $\mu\text{m}$  were studied at Resolute Passage in the Canadian Arctic during the algal bloom in spring 1992. The spatial variation in biomass beneath a 225m<sup>2</sup> area with changing snow cover was almost as great as the temporal change (under a constant snow cover) over the 5 weeks sampling period. Cell density in the ice varied from  $\leq 7 \times 10^7$  to  $2.6 \times 10^9$  cells m<sup>-2</sup>. Total bacterivory of the protozoan community was assessed by measuring the disappearance of fluorescently labelled bacteria over 20 h. Feeding rates by heterotopic nanoprotozoans (HNAN) were high at the beginning of the sampling period (late April) but decreased to very low values by the end of May; HNAN clearance rates ranged from  $\leq 3$  to 86 nl HNAN<sup>-1</sup>h<sup>-1</sup> (mean=12nl HNAN<sup>-1</sup>h<sup>-1</sup>) while ingestion rates ranged from  $\leq 3$  to 64 bacteria HNAN<sup>-1</sup> h<sup>-1</sup>. The carbon budget analysis indicates that bacteria alone could not provide the required energy for the observed protozoan growth. The results suggest that a shift in the grazing behaviour of HNAN occurred during the bloom season, modifying the microbial food web dynamics.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Resolute Passage, N.W.T.



## UNIVERSITY OF MANITOBA

**95-068 DROBOT, S., ONSTOTT, R. and GRENFELL, T. (1995).** The electromagnetic site. Paper, SIMMS 1995 Data Report, Centre for Earth Observation Sciences, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

This report outlines the daily activities and data collection methods of the SIMMS'95 electromagnetic site (E/M site). The main objective of the E/M site was to characterize the seasonal evolution of microwave signatures over a snow covered FYI location. To accomplish this two active radars, one passive radiometer, and snow geophysical measurements were taken. The active sensors measured microwave backscatter signatures in the C and X bands, while the passive radiometer monitored emissivity values in the band. The snow geophysical measurements are essential to fully characterize how the snowpack is affecting both the active and passive forms of the microwave signals.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Resolute Bay, N.W.T.

**95-069 GREEN, R.G. (1995).** Aboriginal sentencing and mediation initiatives: the sentencing circle and other community participation models in six Aboriginal communities. Thesis paper, Faculty of Law, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

The imposition of an alien justice system on Canadian Aboriginal communities has led to systemic inequities and its authority has been strongly resisted. Through a conjoint revision of sentencing practices by members of the judiciary and local community members, a variety of innovative sentencing practices have been implemented. This study analysed community sentencing and mediation in Canadian Aboriginal communities and investigated six initiatives in central and northern Manitoba and Saskatchewan. Sixty-six interviews were conducted with fifty-one respondents who were members of the communities studied or were lawyers, police, probation officers and judges involved with these communities. Four community participation models were identified: circle sentencing, the sentence advisory committee, the Elders' or community sentencing panel and the local mediation committee. Community members described estrangement from and resistance to the prevailing court system and conventional sentencing practices; and feelings of empowerment. in particular for participants in community sentencing and mediation. All initiatives involved varying degrees of relationship between formal (state) and informal (local) systems of law and social control. These approaches have developed almost exclusively in rural Aboriginal communities. A combination of available local systems of social control and the communal nature of

Aboriginal society has assisted in the development of these initiatives. Despite such concerns as the potential for local political interference and the role and protection of victims, the evolution of community sentencing and mediation appears to have had an empowering effect on Aboriginal communities. The continued development of such initiatives will depend upon many factors including local community and judicial support and accessibility of treatment facilities.

**DISCIPLINE:** Law.

**FIELDWORK LOCATION:** Northern Manitoba and Northern Saskatchewan.

**95-070 IACOZZA, J. (1995).** Snow Catchment. Paper, SIMMS 1995 Data Report, Centre for Earth Observation Sciences, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

This section of the data report provides a summary of the site sampled and the methodology used to acquire the data for the snow catchment study conducted during the SIMMS '95 field experiment. The snow catchment study will attempt to model the snow distribution patterns over multi-year and first year sea ice. Previous studies dealing with snow catchments have examined exclusively the patterns of snow distribution over terrestrial surfaces, while the patterns over sea ice have been relatively ignored. The SIMMS '95 field experiment has allowed this researcher to collect the surface data required to model the snow distribution patterns over the “icescape”, a term originally introduced by LeDrew et al. (1994). Processes operating over the terrestrial landscape and the “icescape” are somewhat similar, however there are differences in the two landscapes that may result in different snow distribution patterns observed over land and ice. Sea ice may go from a very “hilly” topography in the multi-year ice area, to a relatively “flat” topography over the first year ice area in a very short distance (less than 500 m). This drastic change in topography would impact the snow distribution patterns over the ice in ways not examined in the previous literature.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Lowther Island, Resolute Bay, N.W.T.

**95-071 MCDONALD, I. (1995).** Evidence of occupation: mapping toponyms of the Cross Lake First Nation. Research Report, Natural Resources Institute, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

Intimate knowledge of a land by people indicates historical and contemporary occupancy of that land. Land occupancy by Aboriginal groups has been demonstrated in previous studies by recording the presence of birth sites, burial sites, toponyms, areas present in stories or

legends, and the extent of traditional ecological knowledge. The community of Cross Lake is located near the north shore of Lake Winnipeg, Manitoba. Knowledge of Aboriginal use of Cross Lake and the surrounding region extends back to the arrival of the Hudson Bay Company. Occupancy of the land by members of the Cross Lake community was documented by conducting formal and informal interviews with 10 key informants. The names, locations, meanings and English translations of 174 toponyms of the Cross Lake area were recorded. The extent of geographical, ecological and cultural knowledge of the Cross Lake area by members of the Cross Lake community clearly demonstrates historical and contemporary occupancy of the region.

**DISCIPLINE:** Sociology.

**FIELDWORK LOCATION:** Cross Lake Community, Northern Manitoba.

**95-072 NICHOLS, T. (1995).** Ringed seal habitat. Paper, SIMMS 1995 Data Report, Centre for Earth Observation Sciences, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

This work is a continuation of a project begun during SIMMS'94. The objective is to investigate the applicability of SAR imagery for stratification of ringed seal habitat. Current research extended between Day 95 and Day 128 over a 20 square km grid located west of Lowther Island. The grid incorporated multi year and first-year ice types, and deformational features including pressure ridges, rubble, and *nagutti* (temperature-induced ridges). Surface features and ice types were easily recognizable on microwave imagery produced by the band radar on the CV-580 due to differences in reflectance values and geometry. The relevance of the SAR imagery to seal habitat is found in the snow catchment abilities of first-year ridges and multi year/first-year dichotomies along the lee and windward slopes. The production of stable drifts permits active excavation from the underside to occur as the seals construct lairs for the purpose of resting or pupping. Ringed seals are well adapted to successful survival year-round in the land fast ice areas of the high Arctic. Seal distribution is dictated by prey availability and sea ice type. This research focuses mainly on the effects of sea ice type.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Lowther Island, Resolute Bay, N.W.T.

**95-073 TALLMAN, R.F., SAURETTE, F. and THERA, T. (1995).** Migration and life history variation in Arctic Charr, *Salvelinus alpinus*. Research Report, Department of Zoology, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

Migratory and non-migratory forms have been observed in many Salmonoid fishes including Arctic salmonids and coregonids. To test the hypothesis that migratory Arctic charr, *Salvelinus alpinus*, will have higher age at maturity, age-specific fecundity, greater longevity and greater size at age than the non-migratory life history forms we used data collected from various sites in the Northwest Territories and surveyed the published literature. Arctic charr showed a clear life history dichotomy with migratory forms maturing at older ages, having higher fecundity and greater longevity. The mean fork length at age 5 did not differ significantly between the two forms.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** N.W.T.

**95-074 TALLMAN, R.F. and THERA, T. (1995).** Life Cycle model on the Mackenzie River Broad Whitefish. Research Report, Department of Zoology, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

The Mackenzie River is thought to contain an abundance of fish resources which are heavily exploited by subsistence and commercial users. The broad whitefish, *Coregonus nasus*, is the most important species, followed by the inconnu, *Stenodus leucichthys*. It is currently hypothesized that these fish resources remain undamaged by exploitation. However, there is no overall model which takes into account the complex physical setting, the large geographic and temporal scale of events, and the complex biology of the organism in order to understand the population dynamics of this system. We used a systems analysis approach to develop a quantitative model of the population dynamics of the broad whitefish in terms of fishing and natural mortality, growth, recruitment, and migration. Important interactions between various components of the system are modelled. The model can be used as a tool to support or disprove hypotheses previously formulated about this system and aid in the management of the broad whitefish fishery. It may also be modified to be applied to other species such as inconnu.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Mackenzie River, N.W.T.



## UNIVERSITÉ MCGILL

**95-075 CARRIÈRE, S. (1995).** L'évolution des stratégies aviaires de reproduction: le déclin controversé d'un paradigme chez les oies et bernaches nichant dans l'Arctique.  
Rapport d'étude, Département de biologie, Université McGill.

### **RÉSUMÉ/DESCRIPTION:**

Un phénomène quasi universel est observé chez les populations d'oiseaux: la taille des couvées et le succès reproducteur déclinent avec la date de ponte. Le rôle de la nourriture arctique dans les hypothèses expliquant ce phénomène suscite une controverse chez les chercheur(e)s étudiant les oies et bernaches nichant dans l'Arctique. L'idée qu'une stratégie de reproduction particulière ai évolué chez ces Anatidés est un paradigme dans la littérature. Les femelles utiliseraient presque exclusivement des réserves énergétiques apportées du sud pour mener à bien la formation des oeufs, favorisant ainsi une reproduction hâtive et indépendante de la disponibilité de la nourriture arctique. Chez ces oiseaux, les réserves détermineraient la taille de la couvée. Le déclin saisonnier des couvées résulterait donc simplement du déclin des réserves chez les femelles ayant retardé la ponte, retard due au nombre restreint des sites de nidification avant le pic de fonte des neiges. Plusieurs observations permettent maintenant de réfuter cette hypothèse. Les oies et bernaches ne feraient plus exception. Le déclin des tailles de couvée semble être une adaptation au déclin saisonnier du succès reproducteur. La disponibilité de la nourriture avant et durant la formation des oeufs dans l'Arctique limiterait la condition énergétique des femelles et influencerait directement les stratégies (date de ponte et taille de couvée) individuelles et optimales de reproduction.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Arctique canadien.



## MEMORIAL UNIVERSITY

**95-076 MACDONALD, M. (1995).** Ecotourism and Resource Management in Churchill, Manitoba. Research Paper, Department of Geography, Memorial University.

**ABSTRACT/DESCRIPTION:**

The purpose of this paper is to determine whether or not Ecotourism activity in Churchill, Manitoba is having a significant impact upon the tundra ecosystem. Three types of tour activity; hiking, helicopter and tundra vehicle tours, will be evaluated for their potential cumulative impacts on the flora and fauna, specifically polar bears. It is hypothesized that present levels of tour activity are exceeding the threshold limit of the tundra environment. In addition, this paper will address the problem with overlapping governmental jurisdictions and policies of the institutional agencies involved.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Churchill, Northern Manitoba.



## UNIVERSITÉ DU QUÉBEC À CHICOUTIMI

**95-077 CORCORAN, P.L. and MUELLER, W.U. (1995).** Alluvial-fan and fluvial-dominated deposits in an ancient strike-slip basin: Archean Beaulieu rapids formation, N.W.T. Research Report, Sciences de la terre, Université du Québec à Chicoutimi.

### **ABSTRACT/DESCRIPTION:**

The Beaulieu Rapids Formation (BRF) contains sedimentary facies associations and structural features that are consistent with basin formation during initial strike-slip movement. The north-trending, 9.5 km-long sequence displays a lazy-S shape and is bound on the north, east, and south by faults. The western margin of the basin is an unconformity that is intermittently identifiable for at least 5 km along strike between the mafic- to intermediate-volcanic rocks of the Beaulieu River volcanic belt (BRVB) and the overlying BRF. Fault margins are also bound by the BRVB, save for the northeastern limit of the basin where porphyry stocks and/or dykes exist as thin discontinuous packages for 3.5 km. An U-Pb age determination for the porphyry stocks constrains the timing of basin evolution and the later but associated deformation. The lateral distribution of the different facies associations in conjunction with the basin asymmetry, the unconformity and the bounding faults are all characteristic of strike-slip basins. The hypothesis that the BRF was deposited in a strike slip basin is reinforced by the presence of a pervasive north-northeast trending foliation and several echelon folds that are parallel to each other and to the foliation, but oblique to the basin strike; these are prominent features of strike-slip deformation.

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Beaulieu Rapids Formation, N.W.T.

**95-078 CORCORAN, P.L. and MUELLER, W.U. (1995)** The Archean Keskarrah Formation, Cyclops Peninsula, Point Lake: a distinct late orogenic, volcano - sedimentary basin. Research Report, Sciences de la terre, Université du Québec à Chicoutimi.

### **ABSTRACT/DESCRIPTION:**

The Slave Province is a complex of volcanic belts, extensive sedimentary assemblages and gneisso-plutonic sites and that formed between 4.0-2.6 Ga. The 2,600 Ma volcano-sedimentary Keskarrah Formation, and the time equivalent Jackson Lake and Beaulieu Rapids Formations represent the youngest basin-forming event in the Slave Province. Detailed mapping (1 :2,000 and 1 :50) of the 1.5x2 km-large Cyclops Peninsula (65°15' 30"N 113°8'30"W) in conjunction with preliminary facies analyses, show that mafic volcanism and clastic sedimentation were contemporaneous in the Keskarrah Formation. Late-stage volcanism, common to late-orogenic, successor basins in the Wabigoon and Abitibi Sub-provinces, has recently been documented in the Hood River belt (2600 Ma) and has now been

established in the Point Lake belt Mafic volcanic rocks dominate the eastern part of Cyclops Peninsula, but are progressively interstratified with sedimentary rocks towards the west. Š

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Cyclops Peninsula, N.W.T.

**95-079 CORCORAN, P.L. and MUELLER, W.U. (1995).** The Beaulieu Formation, Slave Province, N.W.T: A late orogenic molasse basin? Research Report, Sciences de la terre, Université du Québec à Chicoutimi.

**ABSTRACT/DESCRIPTION:**

Archean supra crustal sequences are complex associations of volcano-sedimentary successions intruded by or tectonically interleaved with gneissic-plutonic rocks. The Slave Province, in contrast to most granite-greenstone belts, is characterized by (i) a greater abundance of sedimentary than volcanic units, (ii) a higher felsic/mafic ratio in the volcanic regimes, (iii) abundant evidence for a sialic basement, and (iv) more evolved potassium-rich granites. The question arises as to whether this is an artifact of deformation and rock preservation, or is the Slave Province a distinct type of Archean craton. In order to test this hypothesis, detailed facies analysis of the sedimentary units are required. The aim of this multi-year field study with the support of the Geology Division of Indian and Northern Affairs (Yellowknife) is to characterize the late-stage basin-forming events in the Slave Province. Initial sedimentary studies commenced in 1993 on the Jackson Lake sedimentary rocks and continued in 1994 on a similar sedimentary unit to the east, the Beaulieu Rapids Formation.

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Beaulieu Formation, N.W.T.

**95-080 CORCORAN, P.L., MUELLER, W.U., CHOWN, E.H., ROY, D.W. and PADGHAM, W.A. (1995).** Tectonically-controlled sedimentation in the slave province: an example from the Beaulieu Rapids formation. Research Report, Sciences de la Terre, Université du Québec à Chicoutimi.

**ABSTRACT/DESCRIPTION:**

The Archean Beaulieu Rapids Formation (63°05'-63°00' 112°25'-112°23'), is representative of the younger sedimentary units within the Slave Province. An unconformity, traceable for at least two kilometres along strike, separates the older, mafic volcanic hinterland composed of massive, brecciated, pillowed and hyaloclastite flows from the sedimentary rocks of the Beaulieu Rapids Formation. Facing direction within the basin is primarily to the east, save for the northern portion of the study area where polarity reversals exist due to local s- and z-

folds. A recent U-Pb age of 2624 Ma, determined for a plutonic cobble from a conglomerate unit, supports late-stage sedimentary deposition. Four lithological units are defined, based on grain size clast sedimentary structures.

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Beaulieu Rapids Formation, N.W.T.





## UNIVERSITÉ DU QUÉBEC À MONTRÉAL

**95-081 TREMBLAY, A. et CLOUTIER, L. (1995).** Évaluation des flux de mercure dans les réservoirs hydro-électriques: Rôle des insectes aquatiques. Rapport d'étude, 63ième congrès de L'ACFAS, Chicoutimi, Québec, 22-26 mai 1995.

### **RÉSUMÉ/DESCRIPTION:**

La création de réservoirs hydro-électriques provoque une augmentation de la concentration en mercure (Hg) dans les poissons. Il existe une relation entre la superficie du territoire inondé et les taux d'accumulation du Hg chez les poissons. Ainsi, aux apports atmosphériques directs et à ceux du bassin versant s'ajoute un largage du Hg à partir des sols inondés. Certaines études ont démontrées que les insectes aquatiques étaient fortement contaminés par le Hg, avec des teneurs de l'ordre de 300-1800 ng.g<sup>-1</sup> poids sec, et qu'ils pouvaient représenter un vecteur de transfert important de ce contaminant des sols inondés vers la chaîne trophique. Les flux de Hg des insectes adultes, capturés à l'aide de cages à émergences flottantes, provenant de réservoirs hydro-électriques, âgés de 1 et 2 ans, et de deux types de sols inondés (tourbière et podzol à cladine) seront comparés à ceux d'un lac naturel. L'évaluation des flux de Hg est un élément clé pour l'élaboration de modèles mécanistiques plus fiables de l'évolution du mercure dans les compartiments d'un réservoir.

**DISCIPLINE:** Écologie/Sciences de l'environnement.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**95-082 TREMBLAY, A., LUCOTTE, M. et CLOUTIER, L. (1995).** Contamination par le mercure des insectes de lacs naturels du moyen nord du Québec. Rapport d'étude, 63ième congrès de L'ACFAS, 22-26 mai 1995, Chicoutimi, Québec.

### **RÉSUMÉ/DESCRIPTION:**

Le mercure (Hg) gazeux émis dans l'atmosphère par les activités humaines est transporté sur des distances considérables. En réponse à ces émissions, les concentrations de Hg dans les sédiments et les poissons de lacs naturels ont augmenté au cours des dernières années. Les insectes aquatiques qui vivent sur ou dans les sédiments contribueraient à transférer le Hg sédimentaire, vers les poissons, alors qu'ils représentent jusqu'à 93 pour-cent de leur alimentation. Suite à un échantillonnage de 12 lacs, nos résultats préliminaires démontrent que les insectes sont des bio-accumulateurs efficaces avec des concentrations de Hg allant de 40 à 355 ngg-l poids sec et avec des teneurs en méthylmercure de 4 à 288 ng-g-l poids sec. Le pourcentage de Hg méthyle varie de 4 à 95 pour-cent selon la famille d'insecte, la saison (printemps, été, automne) et le niveau trophique des insectes (des détritivores aux prédateurs).

**DISCIPLINE:** Écologie/Sciences de l'environnement.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

## QUEEN'S UNIVERSITY

**95-083 DOUGLAS M.S.V. and SMOL, J.P. (1995).** "Periphytic diatom assemblages from high Arctic ponds". Journal of Phycology, 31:60-69.

**ABSTRACT/DESCRIPTION:**

Epiphytic, epilithic and surface sediment diatom assemblages were identified and enumerated from 35 study ponds on Cape Herschel (78°37'N, 74°42'W), east-central Ellesmere Island, Canada. All the sites are shallow (maximum depth <2m), clear, oligotrophic, and freshwater. The ponds freeze completely for 10 months of the year. Major ion concentrations are relatively similar among the 35 sites, although environmental gradients exist. Over 130 diatom taxa from 28 genera were identified in the periphyton samples. Marked differences in species composition were evident among the ponds. Moreover, many of the diatoms exhibited varying degrees of microhabitat specificity. Variance partitioning by canonical correspondence analysis showed that 26 percent of the total variance exhibited by diatom species composition could be accounted for in the measured environmental variables (i.e. 10.2 percent by habitat and 15.8 percent by water chemistry). Pond water alkalinity best explained the distribution of taxa, and weighted averaging regression and calibration were used to develop a transfer function to infer pond water alkalinity from the diatom assemblages. Other important environmental variables included (Na<sup>+</sup>) for epilithic and (SiO<sub>2</sub>) for the epiphytic assemblages.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Cape Herschel, Ellesmere Island, N.W.T.

**95-084 DOUGLAS M.S.V. and SMOL, J.P. (1995).** "Paleolimnological significance of observed distribution patterns of chrysophyte cysts in Arctic pond environments". Journal of Paleolimnology, 13:79-83.

**ABSTRACT/DESCRIPTION:**

In a survey of 35 high Arctic ponds, chrysophycean cysts were relatively more common in moss periphyton and epilithon habitats, than in surface sediment samples. The highest percentages of cysts relative to diatoms were found in the semi-aquatic mosses. Although chrysophytes are generally considered to be planktonic, periphytic taxa may be common in high latitudes. The ratio of diatom frustules to chrysophyte cysts in Arctic sediment cores may be tracking different environmental variables than paleolimnologists may intuitively expect based on observations from more temperate regions.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Cape Herschel, Ellesmere Island, N.W.T.

**95-085 DOUGLAS M.S.V., DOUBLEDAY, N.C. and SMOL, J.P. (1995).** “Paleoenvironmental studies of black carbon deposition in the High Arctic: a case study from the Northern Ellesmere Island”. The Science of the Total Environment, 160(16):661-668.

**ABSTRACT/DESCRIPTION:**

The application of paleolimnological techniques to studies of anthropogenic black carbon particles in Lower Dumbell Lake, Northern Ellesmere Island, Northwest Territories, Canada, reveals a stratigraphic record of particle deposition over time. Comparison of the anthropogenic black carbon record with the paleoecological record of diatom assemblages in this lake indicates that the diatom flora developed within the period of anthropogenic black carbon particle deposition. This result supports an inference of very recent environmental change.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Lower Dumbrell Lake, Northern Ellesmere Island, N.W.T.

**95-086 DOUGLAS M.S.V., CUMMING, B.F., SMOL, J.P. and PIENITZ, R. (1995).** “Inferring past climatic changes in Canada using paleolimnological techniques”. Geoscience Canada, Volume 21(3), Paleoecological Environmental Assessment and Research Lab.

**ABSTRACT/DESCRIPTION:**

Paleolimnological approaches have considerable potential for providing paleoclimate proxy data. Indicators such as diatom valves, chrysophyte scales and cysts, and chironomid head capsules may provide both direct and indirect inferences of lakewater temperature and related variables. For example, quantitative transfer functions are now available for certain regions that can infer lakewater temperature from chironomids and diatoms. Meanwhile, the paleolimnological record from closed-basin lakes in arid and semi-arid regions of western Canada can be used to track past climatic/hydrologic changes, as transfer functions have been developed for diatom, chrysophyte and chironomid indicators that can provide quantitative inferences of past lake water salinity. Other climate-related variables that can be tracked include dissolved organic carbon concentrations that can be related to past changes in Arctic treeline, and past ice-cover in high Arctic regions.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** High Arctic.

**95-087 HARRINGTON, J.E.M. (1995).** The origin and diagenesis of Neohelikian grainstones in

the Victor Bay Formation, Northwestern Baffin Island, Canada. Thesis, Department of Geological Sciences, Queen's University.

**ABSTRACT/DESCRIPTION:**

Grainstones from three different locals in the 1200 Ma. Victor Bay Formation on northwestern Baffin Island, exhibit a well preserved framework of grains and diagenetic history. The depositional setting of the locales ranges from lagoonal to oolitic shoal and to slope-ramp. The lagoonal facies gives rise to microspar clasts and dolomitic mudstones which are part of numerous shallowing upwards cycles. These cycles grade upward from deep nodular limestone to molar-tooth to grainstone to laminated stromatolite. The grain stones acted as nucleation sites for the stromatolites. Oolitic shoal facies show excellent preservation of compound coated grains which is indicative of early marine cementation. In addition, these grains were cemented in the marine vadose zone prior to phreatic dolomitization. Slope-ramp facies shows spectacular slump folds and other deep-water sedimentary structures. The fine grain size and the re-sedimentation of grains from the upper ramp confirm this facies. Both the lagoon and shoal facies underwent micritization and dolomitization. The slope-ramps facies however, is calcitic and shows evidence of only neomorphism of high magnesium calcite to low magnesium calcite.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Victor Bay Formation, Northwestern Baffin Island, N.W.T.

**95-088 HAY, M.B. and SMOL, J.P. (1995).** Diatom-based calibration set for paleoflood reconstruction in the Mackenzie Delta, Northwest Territories, Canada. Research Paper, Paleoecological Environmental Assessment and Research Lab, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

This study is an attempt to use diatoms to reconstruct the Holocene flood history of the Mackenzie Delta, N.W.T. Low elevation lakes in the Mackenzie Delta are subject to yearly flooding during the spring break-up of ice in the delta. Lakes found at higher elevations in the delta, however, are flooded only during infrequent years when flood waters rise above average levels. If these lakes demonstrate flooding on a more frequent basis in the past, this may possibly reflect a different climatic regime than that of the present. Diatom flora from frequently flooded lakes should reflect the influence of flood waters with more dilute chemical conditions and reduced light penetration due to the augmented sediment input by flood waters. Surface sediment samples from both high and low elevation lakes were collected and the diatom flora identified and counted. Multivariate statistical analysis, combining the diverse flora and the measured environmental variables for the sampled lakes allowed determination of the dominant measured variables affecting diatoms in the Mackenzie Delta. This analysis shows that diatoms respond to variables influenced by spring flooding. Transfer functions for

the dominant variables were derived and may now be applied to the analysis of the diatom assemblages in long cores from the Mackenzie Delta for Holocene paleoflood reconstructions.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Mackenzie Delta, N.W.T.

**95-089 HOLDER, K. (1995).** Evolutionary divergence of North American Rock Ptarmigan. Research Report, Department of Geography, Queen's University.

**ABSTRACT/DESCRIPTION:**

During the most recent major glaciation, most of Arctic and temperate North America was under ice except for a few refugia. "Beringia", the largest refugium for flora and fauna, extended from Yukon into Siberia. From there, many species recolonized the Nearctic after the ice receded <10,000 years ago. I am exploring the hypothesis that Arctic bird species also survived and diverged in other, smaller northern refugia, by combining studies of molecular evolution, geographic variation in morphology, and current distribution of North American Rock Ptarmigan. DNA amplification and sequencing allow me to determine the sequence of genetic markers. Comparing the number of changes in sequence within and among members of different populations or sub-species provides a measure of the degree to which they have diverged, and an estimate of the time since they shared a common ancestor. This evolutionary history will show whether the common ancestor of North American Rock Ptarmigan subspecies is older than the glaciation (>100,000 years), whether subsequent sub-speciation events are consistent with patterns expected from isolation and divergence in different refugia.

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**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** High Arctic.

**95-090 JOINER, D.W., MCCAUGHEY, J.H. and LAFLEUR, P.M. (1995).** Seasonal variation of energy and mass fluxes over northern boreal young jack pine forest and fen. Paper, American Geophysical Union, Geochemical Society, Mineralogical Society of America, Baltimore, Maryland, May 30-June 2, 1995.

**ABSTRACT/DESCRIPTION:**

Responsibility for a young jack pine forest and a fen site of the Boreal Ecosystem-Atmosphere Study (BOREAS) provides our interdisciplinary research team the opportunity to evaluate and compare surface-atmosphere interactions of two typical boreal forest communities near Thompson, Manitoba, Canada. Climate, ecological, and hydrological properties of the sites were measured continuously in 1994 from snowmelt at the fen and early spring at the forest

to leaf senescence.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Thompson, Northern Manitoba.

**95-091 KIDD, M.G. and FRIESEN, V.L. (1995).** A Guillemot intra specific phylogeny: Inferring population history patterns of geographic variation in cepphus mitochondrial control regions. Paper, Joint Conference of the Colonial Waterbird Society and the Pacific Seabird Group, University of British Columbia, November 8-12, 1995.

**ABSTRACT/DESCRIPTION:**

Geographic structure in a gene pool is the signature of micro evolutionary processes occurring at the population level. Describing such “genetic architecture” is useful for 1) reconstructing population history and biogeographic events, 2) understanding modes of speciation, and 3) making informed decisions on population conservation and management. We assayed sequences variation in the mitochondrial control region (1 Kb) for several birds from each of 8 *Cepphus* sub-species using direct sequencing and analysis of single-stranded conformational polymorphism. Species-level results to date indicate that 1) pigeon and spectacled guillemots are more closely related than either is to black guillemots (consistent with the most plausible biogeographic scenario), and 2) hybridization and introgression may occur between pigeon and black guillemots in areas of sympatry. This work is part of an ongoing study of phylogeography and modes of speciation in genus *Cepphus*.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Norway.

**95-092 LAING, T.E. and SMOL, J.P. (1995).** Past climatic changes in the Siberian Arctic: a diatom-based paleolimnological approach. Paper, International Union for Quaternary Research, XIV International Congress, August 3-10, Freie Universität, Berlin and Paper, XIII NADS, Iowa Lakeside Laboratory, Lake Okoboji, 1995.

**ABSTRACT/DESCRIPTION:**

Knowledge of the extent of past climatic change in tree line regions is important for understanding and predicting the impact of future global change. In this study, we sampled two lake calibration sets spanning the tree line near Norilsk and Tiksi in northern Siberia. Canonical Correspondence Analysis was used to identify the main environmental gradients influencing diatom distributions in surface sediment samples. Temperature, depth, and conductivity were all important in the Norilsk region, while depth, dissolved organic carbon (DOC), and particulate organic nitrogen were important in the Tiksi region. The relatively

strong relationship between the observed diatom distributions and climate-related variables, such as temperature and DOC, indicated the potential for paleoclimate reconstruction using diatom assemblages preserved in Siberian sediment cores. The latter part of our study analysed changes in diatom assemblages within a core from a present-day tundra lake near Norilsk.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Norilsk and Tiksi, Siberia.

**95-093 LAING, T.E. and SMOL, J.P. (1995).** Diatoms as indicators of past environmental and climatic change in the Siberian Arctic. Paper, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

In this study, diatom assemblages were analysed in surface sediments collected from a calibration set of lakes located across the treeline zone in the Taymyr Peninsula and Lena River regions of northern Siberia. Canonical Correspondence Analysis was used to determine the main environmental factors influencing diatom distributions within the set of lakes. Conductivity, dissolved inorganic carbon, temperature, and lake depth were all important in explaining the variation in the diatom species distributions. Diatom assemblages were then analysed from intervals throughout a sediment core collected from a Tundra lake on the Taymyr Peninsula, Siberia. Here, we present changes in the diatom assemblages within the core and discuss some potential paleoclimate interpretations. The results from our study will be combined with other palaeoecological analyses as part of the Palaeoecological Analysis of Circumpolar Treeline project.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Taymyr Peninsula, Siberia.

**95-094 LEFEVRE, K.L. (1995).** Parent-offspring vocal recognition in the thick-billed murre (*Uria lomvia*). Paper, Joint Conference of the Colonial Waterbird Society and the Pacific Seabird Group, University of British Columbia, November 8-12, 1995.

**ABSTRACT/DESCRIPTION:**

Recognition between parents and young exists in many animal species, when there is a risk of intermingling of adults and/or young. This risk is high for some colonial breeding alcid. We studied the potential for parent-offspring recognition in the thick-billed murre on Coats Island, N.W.T. Behavioural observations suggested that chicks respond to parental vocalizations; we assessed the ability of chicks to distinguish between the calls of (1) parents



and strangers, (2) parents and neighbours, and (3) neighbours and strangers using play backs in an experimental enclosure. Chicks preferentially approached parental calls over both stranger and neighbour calls from an early age (four days) but made no choice between neighbour and stranger calls. Chicks likely recognize their parents' calls for successful colony departure and to avoid aggression from conspecific adults.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Coats Island, N.W.T.

**95-095 MCEWEN, A. (1995).** Local song sharing by American robins at Churchill, Manitoba. Thesis Report, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

The songs of 3 American robins (*Turdus migratorius*) from each of 5 sites in the vicinity of Churchill, Manitoba were analysed to examine song sharing between individuals. Significantly more song sharing was observed within than between sites and song sharing decreased significantly as the distance between sites increased. At Churchill, individual variation was observed in the phrase duration of song types whereas this variation is not observed in southern Ontario. This difference between sites may reflect reduced acoustic competition in Churchill. Variation between sites was observed in the number of high-frequency, irregular song types sung by individuals. The general structure of song types in Churchill and patterns of song sharing are consistent with results in southern Ontario despite the different ecological circumstances of the two regions.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Churchill, Northern Manitoba.

**95-096 ROBERTSON, G.J. (1995).** Factors affecting nest site selection and nesting success in the Common Eiders (*Somateria mollissima*). Research Report, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

Nesting site selection and nesting success in Common Eiders, *Somateria mollissima*, were studied over a three year period (1991-1993), in the Mast River delta (58°24'N, 94°24'W), 40 km east of Churchill, Manitoba. Eiders preferentially nested on islands that had incubating Lesser Snow Goose, *Anser caerulescens caerulescens*, nests on them: this effect was also seen between years on the same islands. More eiders nested on islands that had been successful the previous year (at least one duckling hatched on the island). Eiders which nested on islands with geese had a reduced chance of having eggs depredated during egg laying and

had a greater chance of hatching successfully once incubation had begun. There was an inverse correlation between the distance from a goose nest and egg survival during egg laying, but there was no correlation with distance from a goose and the chances of incubating nests reaching hatch. Artificial eider eggs placed closer to goose nests had a lower probability of being depredated. Nests on islands farther up the river and farther from the mainland had higher nesting success depending on the year, presumably because these nesting islands were inaccessible to Arctic Foxes, *Alopex lagopus*.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Mast River Delta, La Pérouse Bay, Northern Manitoba.

**95-097 WHITTAM, B. (1995).** Geographic variation in songs of the yellow warbler (*Dendroica petechia*). Thesis Report, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

The wood warblers (sub-family *Parulinae*) sing different songs for mate attraction (Type I songs) and territorial defence (Type II songs), thus providing an excellent opportunity to study the effects of inter- and intra-sexual selection, respectively, on the evolution of bird song. I chose to study these effects by examining the geographic variation in Type I and Type II songs of the yellow warbler (*Dendroica petechia*). I recorded yellow warblers at three widely-separated locations in Ontario and Manitoba from May to July 1994, and examined geographic variation separately for Type I and Type II songs both within and between these distant populations. §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Ontario and Northern Manitoba.

UNIVERSITY OF SASKATCHEWAN

**95-098 BORTOLOTTI, G.R. and WIEBE, K.L. (1995).** “Egg size and clutch size in the reproductive investment of American kestrels”. Journal of Zoology, London 237:285-301.

**ABSTRACT/DESCRIPTION:**

We studied causes and consequences of egg-size variation among clutches of American kestrels (*Falco sparverius*). Eggs from 275 clutches were measured from 1990 to 1992. To test the hypothesis that the size of eggs was constrained by food availability in the pre-laying period, we censused small mammal populations in the three years and performed a food supplementation experiment in 1990 and 1991. Kestrels did not advance the date they laid their first egg but did lay significantly larger eggs in response to extra food. The size of eggs was correlated with small mammal abundance on the territory, and females in good body condition tended to lay large eggs. Body size did not affect egg size, and there was no relationship between egg size and laying date except in 1990, the poorest food year. Clutches with a large mean egg volume had better hatching success than clutches containing small eggs. We argue that there is a phenotypic component to egg size in kestrels, and that kestrels use egg size to fine-tune reproductive investment to available resources.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**95-099 BORTOLOTTI, G.R., WIEBE, K.L. and GERRARD, J.M. (1995).** Diversity and population trends of the birds of Besnard Lake. Conference Proceedings, The Churchill: A Canadian Heritage River, Saskatoon, March 8-10, 1995.

**ABSTRACT/DESCRIPTION:**

This paper is a summary of birds sighted in the vicinity of Besnard Lake, Saskatchewan (55°20'N 106°00'W) as obtained from our extensive fieldwork from 1968 to 1994. We compare our data to existing information on the diversity of birds to existing information on the diversity of birds nearby areas, and discuss population trends over time from other fieldwork that we have done. As with all bird lists, one must put the data into perspective by considering the objectives of the observers, the coverage of the area, and changes in the landscape that have occurred over time. Therefore, we discuss why we put this list together, and provide information on physical and biological features of the area, as well as its history, that may be relevant to the distribution and abundance of birds. §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**95-100 LEPAGE, B.A. and BASINGER, J.F. (1995).** The Evolutionary History of the Genus: *Larix (Pinaceae)*, Paper, Symposium on Ecology and Management of Larix Forests, A Look Ahead, Whitefish, MT. U.S.A., October 5-9, 1992.

**ABSTRACT/DESCRIPTION:**

The genus *Larix* Miller, commonly known as the larches or tamaracks, is widely distributed across North America, Asia and Europe and is a prominent component of the boreal, montane and sub-alpine forests. The genus has 10 species: three endemic to North America and even occurring in Asia and of Europe. Living larches appear to form two natural, morphological distinct groups: the widely distributed short-bracted forms and the geographically more restricted long-bracted forms. Only short-bracted species are represented in the fossil record; the ecologically distinct long-bracted forms as yet lack a fossil record. The fossil record of *Larix* indicates that the genus has long been widely distributed throughout the high latitudes of North America and northeastern Asia but reached Europe only in the last few million years. Phylogenetic relationships of the genus *Larix* have been interpreted.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** N.W.T.

**95-101 POLISCHUK, S.C., LETCHER, R.J., NORSTROM, R.J. and RAMSAY, M.A. (1995).** "Preliminary results of fasting on the kinetics of organochlorines in polar bears (*Ursus maritimus*)". The Science of the Total Environment, 160/161: 465-472.

**ABSTRACT/DESCRIPTION:**

We determined concentrations of polychlorinated biphenyls (PCBs), chlordanes (CHLORs), chlorobenzenes (CBzs), hexachlorocyclohexanes (HCHs), chlorodiphenyltrichloroethane (DDT) and its metabolites (DDD and DDE) in the tissues of individual polar bears (*Ursus maritimus*) before and after a lengthy period of fasting. Polar bears are an ideal model for such studies. They undergo one of the most extreme fasts known for any mammal and are located at the top of a long food chain, thus biomagnification of organochlorines (OC) is significant. Adipose tissue and milk were collected from different reproductive classes of adult females (solitary/pregnant, with cubs-of-the-year, with yearling cubs) and were analysed for organochlorine content. As the fasting period progressed and adipose reserves decreased, concentrations of some organochlorines in the adipose tissue and milk increased on a lipid weight basis. The transfer of contaminants from mothers to offspring thus also increases with duration of the fasting period. This phenomenon could adversely influence the survival and growth of cubs during the critical early phase of their development.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Churchill, Northern Manitoba; Resolute, N.W.T.

**95-102 SCHAEFER, J.A. and MESSIER, F. (1995).** “Scale-dependent correlations of Arctic vegetation and snow cover”. Arctic and Alpine Research, 27 (1):38-43.

**ABSTRACT/DESCRIPTION:**

We examined micro scale correlations between tundra vegetation and snow cover on southeastern Victoria Island, Arctic Canada. Univariate and multivariate relationships were assessed using correlation analysis and canonical correspondence analysis (CCA). Scale was modified by altering the size of the sampling unit (i.e., grain) from 1 to 1000 m. Correlation coefficients between single species and thickness of snow generally increased with increasing scale. At the largest scale, maximal correlations were found between mean thickness and percent cover of graminoids ( $r = 0.76$ ) and *Saxifraga oppositifolia* ( $r = -0.67$ ). Both snow thickness and graminoid cover were negatively related to elevation at least at the smallest grain. CCA revealed that lowland species (*Carex atrofusca*, *C. aquatilis*, *C. bigelowii*, *Eriophorum angustifolium*, *Arctagrostis latifolia*, *Equisetum* spp. *Salix lanata*) exhibited positive associations with the thickness, basal hardness and mean hardness of snow cover, and the frequency of pukak (depth hoar). Upland species (*Cassiope tetragona*, *Cetraria* spp., *Oxvtropis* spp., *Saxifraga oppositifolia*) showed the converse relationships. These patterns were generally consistent across scales. Snow cover variables accounted for an increasing proportion of the variance in plant composition as scale increased.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Victoria Island, Canadian Arctic.



**SIMON FRASER UNIVERSITY**

**95-103 DARWENT, C.M. (1995).** Late Dorset faunal remains from the Tasiarulik site, Little Cornwallis Island, central high Arctic, Canada. Thesis Report, Department of Archaeology, Simon Fraser University.

**ABSTRACT/DESCRIPTION:**

The purpose of this thesis is to examine the faunal remains from the Late Dorset (1000-1500 B.P.) site of Tasiarulik (QjJx-10), on Little Cornwallis Island, in the Canadian central high Arctic. Archaeological investigation of this site involved two seasons of fieldwork (1992 and 1993). A strictly surface examination of the faunal remains, with identification and analysis completed in the field, was employed the first season. The following summer, we returned to Tasiarulik to excavate and collect a sample of three major feature types: house depressions, tent ring formations, and middens. This has allowed for the comparison of two different data collection techniques. The focus of subsistence at this Late Dorset site was marine mammals, specifically, ringed and harp seal, bearded seal, and walrus. Seasonal exploitation of migratory birds (summer) and Arctic fox (likely for winter pelts) also occurred.š

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Little Cornwallis Island, N.W.T.

**95-104 DARWENT, C.M. and LEMOINE, G. (1995).** The walrus and the carpenter: Late Dorset ivory working. Research Report, Department of Archaeology, Simon Fraser University.

**ABSTRACT/DESCRIPTION:**

Ivory is an important raw material in late Paleo-Eskimo assemblages, but little attention has been paid to it as a technological material. In this paper, we trace the path of ivory from acquisition to discard, using Late Dorset assemblages from the Canadian high Arctic as examples. In particular, we describe the techniques used to extract walrus tusks, reduce them into useable blanks, and work these blanks into tools at two Late Dorset sites on Little Cornwallis Island. Comparisons with the techniques used in other assemblages are discussed (including the degree of re-working broken or exhausted tools), and the implications for group interaction addressed.

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Little Cornwallis Island, N.W.T.

**95-105 GRIFFITHS, C.T., ZELLERER, E., WOOD, D.S. and SAVILLE, G. (1995). Crime, law, and justice among Inuit in the Baffin region, N.W.T., Canada. Research Report, Criminology Research Centre, Simon Fraser University.**

**ABSTRACT/DESCRIPTION:**

The impetus for this project was provided by the Inuit's concern about the high rates of violent and property-related offences in the Baffin Region, widespread alcohol and substance abuse, conflicts experienced by Inuit youth and concern about the future of the region. The federal and territorial governments have been under mounting pressure to support the development of alternative, community-based justice programs and services which, it has been argued, will more adequately address the needs of crime victims, offenders, and communities. Concurrently, the activities of the criminal justice system, including the RCMP, the criminal courts, and corrections systems, have come under increasing scrutiny. These issues have assumed even greater importance with the creation of the new Inuit territory of Nunavut and there is an emerging dialogue relating to the development of models of justice and social service delivery to communities in the region. It is important that these deliberations have the benefit of the views of community residents as well as those involved in the delivery of justice services. The primary objective of the study was to gather information which will be of use to Inuit community leaders, hamlet councils and Inuit political organizations in their efforts to improve the delivery of justice services, either through collaborative arrangements with federal and territorial justice agencies, or through the development of community-based and controlled justice programs and services.

**DISCIPLINE:** Criminology.

**FIELDWORK LOCATION:** Baffin Region, N.W.T.



## UNIVERSITY OF TORONTO

**95-106 CAUSLEY, T. (1995).** Dogrib Vowel Coalescence: An Optimality Theoretic Account. Research Report, Department of Linguistics, University of Toronto.

**ABSTRACT/DESCRIPTION:**

In the last century, Dogrib (Athapaskan) has been rapidly undergoing phonological sound changes which have led to shifts in its verbal and nominal paradigms. Once such change is the loss of intervocalic consonants in the verbal prefix complex, giving rise to vowel-vowel sequences. These vowel-vowel sequences violate constraints on syllable structure in the language and thus motivate a repair strategy of coalescence. The application of coalescence, however, is not found in every vowel-vowel sequence. In this paper, I explore the contexts for coalescence and suggest that the process is sensitive to morphological information such as stem-affix boundaries and affix type. This paper is framed within contained-based Optimality Theory, and the analysis rests on the interaction of morphological alignment constraints and constraints on Input-Output faithfulness.

**DISCIPLINE:** Linguistics.

**FIELDWORK LOCATION:** N.W.T.

**95-107 GADALLAH, F.L. and JEFFERIES, R.L. (1995).** “Comparison of the nutrient contents of the principal forage plants utilized by lesser snow geese on summer breeding grounds”. Journal of Applied Ecology, 32:263-275.

**ABSTRACT/DESCRIPTION:**

1. Goslings and adult lesser snow geese on the breeding grounds require large amounts of nutrients in summer for growth and to build reserves for autumnal migration. As the birds are essentially herbivorous, forage of high nutritional quality is required to meet nutritional demands. 2. Preferred forage species (*Carex subspathacea*, *Puccinellia phryganodes*) during the post-hatch period in summer at La Pérouse Bay, Manitoba, have a higher nutrient content than alternative forage species (*Festuca rubra*, *Calamagrostis deschampsoides*, *Carex aquatilis*, *C. x flavicans*). Geese appear able to detect forage of high nutritional quality. 3. The three elements that were potentially in short supply in the forage for the growth of geese were nitrogen, calcium, and phosphorus. Quantities of these elements in the preferred salt-marsh forage broadly met the estimated dietary requirements of the geese. Amounts of potassium, magnesium, sodium and manganese in both preferred and alternative forage species were adequate for the growth of the geese. These estimates were based on the requirements of domestic geese. 4. The reduced availability of the preferred salt-marsh forage species and the increased use of alternative forage species are associated with a long-term decline in gosling size.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** La Pérouse Bay, Northern Manitoba.

**95-108 GADALLAH, F.L. and JEFFERIES, R.L. (1995).** “Forage quality in brood rearing areas of the lesser snow goose and the growth of captive goslings”. Journal of Applied Ecology, 32:276-287.

**ABSTRACT/DESCRIPTION:**

1. Experimental feeding using captive goslings of lesser snow geese were carried out on the breeding grounds at La Pérouse Bay, Manitoba, in order to determine the birds' ability to utilize different forage types. 2. The birds were allowed to graze salt-marsh swards of either *Puccinellia phryganodes* or *Carex subspathacea*, and inland swards of *Festuca rubra* and *Carex x flavicans*. Duck chow and freshly chopped leaves of *Carex aquatilis* were provided in further trials. The experiments were fully replicated and birds fed for 6 hours. 3. Besides net changes in weight of birds, the following were measured: acid detergent fibre, silica, nitrogen, and phosphorus and ash contents of forage tissues and faeces. Amounts of several inorganic cations and anions in these materials were also determined. 4. In general, the birds gained or maintained weight on the salt-marsh forages which had higher nutrient contents, and lower fibre and silica contents than the alternative species. The birds either maintained or lost weight when feeding either on inland swards or on *Carex aquatilis*. 5. These results support the field evidence that the decline in gosling weight over the last decade reported at La Perouse Bay is the result of a lack of preferred salt-marsh forage and the use of alternative species by the birds.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** La Pérouse Bay, Northern Manitoba.

**95-109 KARELS, T. et al. (1995).** “Population changes of the vertebrate community during a snowshoe hare cycle in Canada's boreal forest”. OIKOS, 74:69-80.

**ABSTRACT/DESCRIPTION:**

We measured the density changes of 22 species of vertebrates during a snowshoe cycle in northern Canada. Hares were the dominant herbivore in the system and changes in their number were correlated with changes in numbers of arctic ground squirrel, spruce grouse, ptarmigan, lynx, coyote, great horned owl, goshawk, raven and hawk owl. Hare numbers were not correlated with numbers of red-backed voles which showed peaks during the low, increase, and early decline phases of the hare cycle. Hawk owls were the only predator whose numbers correlated with changes in red-backed voles while boreal owls and weasels were correlated with densities of *Microrus*. Red squirrel, American kestrel, red-tailed hawk,

northern harrier, wolverine, magpie, and gray jay showed no correlation with hare or vole numbers. We conclude that species in the boreal forests of Canada do not exhibit the strong synchrony found between voles and other members of the vertebrate community in northern Fennoscandia.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Kluane Lake, Yukon.

**95-110 SRIVASTAVA, D.S. and JEFFERIES, R.L. (1995).** “Mosaics of vegetation and soil salinity: a consequence of goose foraging in an Arctic salt marsh”. Canadian Journal of Botany, 73:75-83.

**ABSTRACT/DESCRIPTION:**

Grubbing of roots and rhizomes of salt-marsh graminoids by lesser snow geese at La Perouse Bay, Manitoba, on the Hudson Bay coast, has resulted in a vegetational mosaic. Bare sites, devoid of vegetation, occur adjacent to intact swards (high biomass sites). At some sites destruction of swards is incomplete (low biomass sites). In 1991 and 1992, highest soil salinities occurred in midsummer; surface sediments were flushed of salts by meltwater in spring and by tides in autumn. By late July, in both years, the soil was hyper saline in low biomass and bare sites, unlike that in the high biomass sites. The highest soil salinities were recorded in bare sites, especially in large bare patches. Aboveground plant biomass ( $\text{g. m}^{-2}$ ) was a much better predictor of the salinity of soil water than the water content or redox potential of soil. Evaporative loss of water from tubes buried in sediments was higher in bare sites compared with that in vegetated sites. Differences in evaporation between sites led to large differences in the salinity of soil water but only small differences in soil water content. The upward movement of salts from buried Tyrell Sea sediments appears responsible for the development of hyper saline conditions.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** La Pérouse Bay, Northern Manitoba.

**95-111 SRIVASTAVA, D.S. and JEFFERIES, R.L. (1995).** “The effect of salinity on the leaf and shoot demography of two arctic forage species”. Journal of Ecology, 83:421-430.

**ABSTRACT/DESCRIPTION:**

1. Two important graminoid forage species, *Puccinellia phryganodes* and *Carex subspathacea*, which are eaten by lesser snow geese, are widespread in Arctic coastal salt marshes. Extensive grubbing of these plants by geese has led to increased soil salinity which may restrict their regrowth, particularly for the sedge which grows in less saline sites. 2. The

effects of salinity on leaf and shoot birth and death rates and on mortality of plants of the two species were therefore examined when pot-grown plants of *Puccinellia* were exposed to different salinities under field conditions at La Perouse Bay, Manitoba. A similar experiment on *Puccinellia* was also conducted in a growth chamber. The growth responses of the two species to salinity are discussed in relation to the foraging activities of the geese and the long-term changes occurring in salt marshes on the coast of Hudson Bay.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** La Pérouse Bay, Northern Manitoba.

## TRENT UNIVERSITY

**95-112 PERIN, S. and LEAN, D.R.S. (1995).** The effects of ambient UV-B radiation on lakes of the high Arctic. Abstract, 15th International Symposium, Lake, Reservoir and Watershed Management, Toronto, Ontario, November 6-11, 1995.

### **ABSTRACT/DESCRIPTION:**

Decreases in stratospheric ozone has resulted in increased UV-B (280-320 nm) radiation at the earth's surface. During the summer of 1993, short term experiments were conducted in two lakes of the high Arctic (Mould Bay, Prince Patrick Island) to assess the effects of ambient UV-B exposure on phytoplankton primary production and its size distribution. Even though productivity rates were low in both lakes, inhibition of photosynthesis occurred when phytoplankton populations were incubated near the surface or on shore. Photo inhibition was not accompanied, in general, by any changes in the relative contribution of the Pico- (0.2-2 mm), Nano- (2-20 mm) and netplankton (> 20 mm) to productivity, suggesting that all size classes are affected. However, cells of size 0.2-1 mm showed, in some instances, to be more UV-B tolerant than all other class sizes. Light intensity was the principal component responsible of Photo inhibition and UV-B intensified the photo inhibitory effect. Photo inhibition of phytoplankton populations of both lakes depended both on the duration of exposure to visible light and UV radiation and on the irradiance levels received during that period. Phytoplankton responses were highly variable because, in nature, irradiance levels and time of exposure are dependent on many factors such as the attenuation of visible light and UV radiation in the water column, water mixing, wind speed and the influence of air and water temperatures on stratification. In addition, cloud cover, rain, fog, and snow can change the amount of visible light and UV radiation on a daily basis.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Mould Bay, Prince Patrick Island, N.W.T.



## UNIVERSITY OF VICTORIA

**95-113 MOREWOOD, W.D. (1995).** High Arctic *Gynaephora* species and their insect parasitoids. Research Paper, Department of Biology, University of Victoria.

### **ABSTRACT/DESCRIPTION:**

Fieldwork was conducted at Alexandra Fiord, Ellesmere Island, from 28 May to 18 August 1995, as part of a continuing study of host-parasitoid interactions centred around *Gynaephora* species (Lepidoptera: Lymantriidae). Both *G. groenlandica* and *G. rossii* are included in this study, but emphasis has been placed on *G. groenlandica* because of the much greater abundance of this species at Alexandra Fiord. Three primary parasitoids (one ichneumonid and two tachinids) and one hyperparasitoid (an ichneumonid) comprise the parasitoid complex of *Gynaephora* species at this site. Larval parasitism of *Gynaephora* forms the base of this parasitoid complex, along with occasional larval-pupal parasitism by one of the tachinid flies; no egg parasitism has been found despite the abundance of *Gynaephora* eggs as a potential host resource and the presence of a number of minute species of unidentified Hymenoptera.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.

**95-114 MOREWOOD, W.D. (1995).** Studies on temperature relations of the Arctic woolly-bear Caterpillar. Research Report, Department of Biology, University of Victoria.

### **ABSTRACT/DESCRIPTION:**

The Arctic woolly-bear caterpillar, *Gynaephora groenlandica*, is locally abundant in the High Arctic where it may assume the role of dominant herbivore and may also be a very significant food source for breeding birds as well as insects parasitoids. One such area of local abundance is the polar oasis at Alexandra Fiord, Ellesmere Island, a Canadian ITEX site, where the population of *G. groenlandica* is thought to be limited by parasitoid-induced mortality rather than by extreme conditions of the physical environment. Because insect development and activity are strongly temperature-dependent, increased temperatures that are predicted to occur with global warming could alter development rates and/or activity patterns of *G. Groenlandica* and parasitoids, disrupting the balance between populations. This in turn has implications for trophic levels both above (e.g., breeding birds such as snow buntings, *Plectrophenax nivalis* L.) and below (e.g., Arctic willow, *Salix artica*, the main food plant for *G. Groenlandica*) these insects. Temperature relations of *G. groenlandica* and its parasitoids are being investigated both in the field at Alexandra Fiord and in the laboratory at the University of Victoria. Field studies include detailed surveys of activity and development under ambient conditions as well as experimental studies of insects in the "open-top

chambers" used to simulate global warming for ITEX studies. Laboratory studies will involve rearing insects under controlled conditions in order to establish empirical temperature/development relationships.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.



## UNIVERSITY OF WATERLOO

**95-115 CHIPENIUK, R. (1995).** “A repertory grid test of the claim that sense of landscape naturalness is specific to culture”. Cross-Cultural Research, 29(4):335-360.

**ABSTRACT/DESCRIPTION:**

Repertory grid technique was used to test the claim that sense of landscape naturalness is socially constructed and culturally relative, and the reverse claim that sense of landscape naturalness is underlain by universals of human thought. Participants made judgments of sameness and difference concerning elements in a standard landscape of nine elements. Sample groups represented three cultures at extremes along a continuum of ideology concerning human relations with nature: Euro-Canadian at one end, Vuntut Gwich'in and north Baffin Inuit at the other. Results were consistent with the universalist but not the relativist hypothesis. Although principal factors for the three culture samples differ slightly, a common factor is nested within the variation, and it corresponds to the Euro-Canadian construct (natural x man-made). The study has implications for environmental education and environmental planning.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Northern Yukon and Northern Baffin Island.

**95-116 FURGAL, C., SHORTREED, J., KEITH, R., CRAIG, L. and DEWAILY, É. (1995).** Inuit perspectives on environmental contaminants. Report on Avativut/Ilusivut, Risk Management Workshops in Nunavik and Labrador, January 16-19, 1995.

**ABSTRACT/DESCRIPTION:**

The presence of organochlorine compounds and heavy metals in traditional aboriginal foods of Inuit residents of Arctic Canada has been well documented. This report presents the application of risk management principles to the issue of environmental contaminants in Nunavik and Labrador. Risk management is an iterative approach used to assist decision-makers in managing hazards which often require consideration of uncertainty and risk perception issues. The risk management process is adaptive to the need of the decision-making environment such that values, concerns and priorities of stakeholder groups are critical to defining the problem and developing control strategies.

**DISCIPLINE:** Human Geography.

**FIELDWORK LOCATION:** Northern Québec and Labrador.

**95-117 MISURAK, K.M. (1995).** Morphological Changes of a Deep Snow Cover on Multi-year Sea Ice: An Investigation of the Late Winter to Early Spring Evolution. M.A. Thesis, Department of Geography, University of Waterloo.

**ABSTRACT/ DESCRIPTION:**

The morphological changes of a deep snow cover over a melt pond on a multi year sea ice in the Canadian Arctic Archipelago are identified and characterized over the transition from winter to early spring. This transition is important in the Arctic as the exchanges of heat, mass and momentum between and through the atmosphere, marine cryosphere and hydrosphere are dynamic. The two primary objectives of this research are to investigate the covariance of the evolving snow, and describe the processes which influence snow grain morphology. Two secondary objectives are to snow grain area distribution and snow grain shape as it relates to snow morphological changes. This research is significant as it broadens the extent of knowledge on the physical properties of a snow cover on multi year sea ice and the morphological changes that occur within it. The results and field recommendations provide a foundation from which to increase the accuracy of the snow sampling methodology for future research. Knowledge of how a seasonal snow cover on multi year sea ice changes will assist in the analysis of remotely sensed data, and improve upon existing climate models.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Barrow Strait, N.W.T.

**95-118 MISURAK, K.M., LEDREW, E.F., BARBER, D.G. and DE ABREU, R.A. (1995).** Spectral albedo of snow-covered first-year and mutli-year sea ice during spring melt. Paper, International Symposium on the Role of the Cryosphere in Global Change, Columbus, Ohio, August 7-12, 1994.

**ABSTRACT/ DESCRIPTION:**

Surface spectral-albedo data collected over snow-covered first-year and multi-year sea ice under diffuse sky conditions during the springtime transition are examined. Of specific interest is the relationship between changes in the visible and near-infrared albedo of sea ice and concurrent changes in the geophysical characteristics of the ice volume. With the onset of melt conditions, visible and near-infrared sea-ice albedo decreased due to physical changes within the snow and ice volumes. Visible albedo was found to be sensitive ti changes occurring throughout the sea-ice volume, while the near-infrared albedo appeared most influenced by near-surface conditions.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Barrow Strait, N.W.T.

**95-119 PIWOWAR, J.M., MCINTYRE, K.A. and LEDREW, E.F. (1995).** Characteristics of pond formation on a melting sea ice surface. Proceedings, 17th Canadian Symposium on Remote Sensing, June 13-15, 1995, Saskatoon, Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Low-level aerial photography in both panchromatic and infrared bands were collected over first-year and multi year ice during melt onset of the SIMMS`93 field experiment near Resolute, N.W.T. Selected photographs were scanned and enhanced for subsequent digital analysis to determine if any terrestrial effects are observable in the pattern of sea ice melt near shore and if the amount of flooding or ponding over the ice could be quantified. The results of our analyses show a significant terrestrial effect on the development of surface melt features during the onset of melt. We show that the amount of ice which undergoes surface flooding decreases exponentially with distance from shore. In addition, we were able to determine that (at a sufficient distance from land) the amount of surface flooding observable was 20 percent over first-year ice and 4 percent on a multi-year flow.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Resolute, N.W.T.



## WILFRID LAURIER UNIVERSITY

**95-120 EARNSHAW, C. (1995).** Health care delivery in the Eastern Arctic: issues in obstetrical care. Paper, Canadian Association of Geographers, CAGONT'95 Conference, October 28, 1995.

**ABSTRACT/DESCRIPTION:**

The health care delivery system in the Baffin Region of the Eastern Arctic (as in other regions of the Canadian Arctic) has been strongly influenced by southern values and procedures. This is especially the case for obstetrical services, largely due to geographic impediments, medicalization of childbirth, and administration of the system by non-Inuit health care workers and policy makers. This paper will briefly address the historic development of the obstetrical services in the North as it is reflected in the present pluralistic system. In particular, the paper will focus on the impact geographical factors have on childbirth procedures and policies.

**DISCIPLINE:** Health/Medicine.

**FIELDWORK LOCATION:** Baffin Island, N.W.T.

**95-121 LAMERS, S.I. (1995).** Grizzly bears and access development in Kluane National Park Reserve. Paper, Department of Geography, Wilfrid Laurier University.

**ABSTRACT/DESCRIPTION:**

The Kluane National Park Reserve is the host to one of the last viable populations of grizzly bears. The remoteness and wilderness of the park have permitted the grizzly bear to survive. However, pressures from outside sources (Yukon Government and citizens) are pushing for development within the Park's boundaries in order to increase human access. Grizzly bears are sensitive to changes in their environment and the impacts can take a long time to recover from. <sup>2</sup> § As with all wildlife species, the grizzly bear is important to the ecosystem but if conservative methods are not adopted in regards to development, the last stronghold of the grizzly bears may be in danger of losing its grizzly bear population. The grizzly bear has been apart of rich Native cultures for many centuries. Grizzly bears are an important aspect to ecotourism in some regions. Proper management and cooperation between Park officials and Yukon Federal Government is important in order to ensure the continued well-being of the grizzly bear while allowing for greater human access into the back country of the KNPR.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Kluane National Park Reserve, Yukon.

**95-122 MCCARDLE, G.J. (1995).** Status and Constraints Upon the Population Growth of Big Game Species. Paper, Honours B.A. in Geography, Wilfrid Laurier University.

**ABSTRACT/DESCRIPTION:**

The wildlife populations of the Kluane Region, Yukon, are an important resource to several different local user groups. The Kluane Region is an area where there is increasing demand for wildlife resources and conflict between human activities and the natural order. The big game species of the Region are of particular importance to local populations. They are intensively managed for subsistence, recreational, trophy and viewing purposes. Two key components to wildlife management are the understanding of population status and the constraints on population growth of managed species. The main objective of this report is to outline the population status and limiting factors affecting population growth for moose, caribou, grizzly and black bear, dall sheep and mountain goat. Secondary objectives include identifying habitat areas and management strategies for each species. The goal of this study were met through literature reviews, interviews and compilation of data obtained from management agencies.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Kluane National Park Reserve, Yukon.

**ANNOTATED BIBLIOGRAPHY BY UNIVERSITY 1996**





## UNIVERSITY OF ALBERTA

**96-001 BRUNGS-SIMARD, A. (1996).** The threat of wildland fire to northern communities: a fire history of the Fort Smith, N.W.T. area. Proceedings, The Future of Our Environment, April 29-30, 1996.

**ABSTRACT/DESCRIPTION:**

Human emigration to wilderness areas is a movement which results in more frequent and extensive wildland/urban interfaces (WUI). Many dangers are associated with the WUI, one of these being fire, as inhabitants of communities scattered within the north-central boreal forest are well aware. Protecting communities from wildfires involves identifying the types of interface(s) present, as well as understanding the historical role of fire in the landscape. This is achieved, in part through, a fire history study. Rationale for studying the Fort Smith, Northwest Territories are: 1) the flammable fuels surrounding the town; 2) the proximity of the town to Wood Buffalo National Park; and 3) incineration at the waste disposal area. Objectives of this study are to reconstruct the fire, drought, and weather history of the Fort Smith area for the past 200 years, and to support the fuel management and community protection plans of the town. Proposed methods include sampling a 400 km<sup>2</sup> area for fire scars using a 4x4 km grid, and a 2x2 km grid in coniferous areas. Fire scars will be dated to establish; fire chronology, and ring width and density will be used to reconstruct the meteorological conditions (specifically drought events) for the past 200 years.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Fort Smith, N.W.T.

**96-002 CLARK, D. (1996).** Terrestrial habitat selection by polar bears (*Ursus maritimus* Phipps) in the western Hudson Bay lowlands. Thesis, Department of Zoology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Polar bears (*Ursus maritimus*) in western Hudson Bay are forced ashore from late July to early November each year by melting sea ice. During this ice-free period, bears segregate by age and sex. I investigated habitat selection by different age and sex classes of bears during the ice-free period using both capture data from 1966 to 1994 and relocations from PTT collared adult females in 1991 and 1992. I compared capture and telemetry locations with habitat descriptions noted at capture locations. I examined factors which might affect habitat preferences such as berry production, avoidance of con-species, and denning opportunities. Avoidance of adult males and the distribution of suitable denning habitat appear to influence habitat selection by female bears, whereas berry production does not. Sub-adult bears do not appear to select different habitat types than those used by other bears. Polar bears in the

Hudson Bay Lowlands dig different types of structures in permafrost, which they use throughout the on-shore season. Dens consist of entrance tunnels with an inner chamber, and resemble maternity dens dug in snow by polar bears. Shallow pits seem to be temporary resting places, and the function of shallow dens, or pit-dens, is unclear. Pits and pit-dens are primarily occupied by lone, presumably pregnant females, while pits are generally occupied by adult males and used more during the summer than autumn. I speculate that these structures each play a role in thermoregulation.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Hudson Bay.

**96-003 FALLAS, K.M. (1996).** The structural and metamorphic evolution of the St. Cyr klippe, south-central Yukon: a progress report. Paper, Tectonics/Structural Geology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The St.Cyr klippe is an exposure of the Anvil and Nisutlin allochthons which have been regionally correlated with the Slide Mountain Terrane. The klippe is located in south-central Yukon between the Tintina Fault on the northeast and Teslin Structure Zone on the southwest. The klippe exposes a contact between parautochthonous rocks of the Cassiar Platform and the obducted Slide Mountain Terrane. On the northeast side of the klippe it is intruded by the mid-Cretaceous, post-kinematic Nisutlin Batholith. Previous work in the area includes regional mapping (1:250 000) by Tempelman-Kluit, and reconnaissance work by Erdmer.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** South-Central Yukon.

**96-004 FRANCIS, S.R. (1996).** Fire History of the Shakwak Trench, Yukon Territory. Research Report, Department of Biological Sciences, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Fire history and forest disturbance is being reconstructed in the Shakwak Trench near Kluane Lake in southwestern Yukon. Historical extent and frequency of burns, burn heterogeneity and patch contagion have all greatly influenced the current, complex vegetation mosaic which exists today. Combined with these factors are forest insects and human impacts. A large spruce beetle (*Dendroctonus rufipennis* Kirby) outbreak is currently affecting this area. Landscape scale interactions between these two disturbance agents, fire and insects, are being examined in a GIS environment.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Shakwak Trench, Yukon.

**96-005 HARPER, K.A. and KERSHAW, G.P. (1996).** “Natural revegetation on borrow pits and vehicle tracks in shrub tundra, 48 years following construction of the CANOL no.1 pipeline, N.W.T., Canada”. Arctic and Alpine Research, 28(2):163-171.

**ABSTRACT/DESCRIPTION:**

An intensive study of long-term revegetation patterns in Erect Deciduous Shrub Tundra on anthropogenic disturbances was conducted in the summer of 1993 within the abandoned CANOL pipeline corridor. Primary and secondary succession were investigated on vehicle tracks and borrow pits by collecting data on the cover of all vascular and non-vascular species. Significant differences in species composition were evident among disturbance types from nested analyses of variance. Disturbance sites were characterized by lower abundance of woody plants and overall greater species richness than undisturbed areas. Borrow pits, still dominated by pioneer species, were in the preliminary stages of succession. Pioneer species persisted on vehicle tracks in the intermediate succession stages, although some species replacement was evident.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** CANOL Pipeline Corridor, N.W.T.

**96-006 HUMPHRIES, M.M. and BOUTIN, S. (1996).** “Reproductive demands and mass gains: a paradox in female red squirrels (*Tamiasciurus hudsonicus*)”. Journal of Animal Ecology, 65:332-338.

**ABSTRACT/DESCRIPTION:**

We studied the response of lactating red squirrels to reproductive demands that were experimentally increased by litter-size manipulations. Females with experimentally increased reproductive demands (‘augment’ females) gained significantly more body mass during the first half of lactation than did unmanipulated (‘control’) females. However, augment females lost more mass following the mid-point of lactation and late summer was negligible for both treatments. Measurements of total body water at the mid-point of lactation confirmed that mass gains during early lactation reflected changes in body fat levels, indicating that females adjusted their energy stores according to their reproductive demands. We also analysed the relationship between early lactation mass gain and natural litter size among a larger group control females, studied at the same site between 1990 and 1994. There was a significant, positive relationship between natural litter size and female mass gain. Furthermore, females characterized by the largest gains in body mass had the highest levels of juvenile survival to

emergence, indicating that early lactation mass gain is an important component of parental investment. These responses suggest that (i) energy storage during early lactation is used to reduce daily energy requirements during late lactation; (ii) breeders use demands during early lactation to 'forecast' requirements during late lactation; and (iii) that despite the elevated energetic demands of lactation, individuals can quickly adjust their energy budgets from slightly positive to highly positive levels.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Kluane, Yukon.

**96-007 KIDD, K.A. (1996).** Use of stable nitrogen isotope ratios to characterize food web structure and organochlorine accumulation in subarctic lakes in Yukon Territory. Research Report, Department of Biological Sciences, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Unusually high concentrations of persistent organochlorines were found in lake trout muscle and burbot liver from subarctic Lake Laberge, Yukon. As a result of the elevated toxaphene concentrations in these fishes, a health advisory was issued by Health Canada in 1991, and the commercial, sport and subsistence fisheries on the lake were closed. Previous studies on Lake Laberge have revealed that the fish community structure is atypical when compared to other regional lakes, with high biomasses of burbot and longnose sucker and low biomasses of lake trout and lake whitefish. Likewise, the lake trout are known to be faster growing, fattier and strictly fish-eating, unlike other populations from nearby lakes. It was hypothesized that the high concentrations of organochlorines in Laberge fishes were the result of an unusually long food chain in this lake, a factor that has been shown to affect the pollutant concentrations in fish from temperate lakes. To characterize food web of Lake Laberge and two reference lakes, Fox and Kusawa, fishes and invertebrates were analysed for stable nitrogen isotope ratios, to quantify trophic position, and persistent organochlorines. Stable nitrogen isotopes were significant predictors of the organochlorine concentrations through these food chains, and in the top predators from these lakes.Š

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Lake Laberge, Yukon.

**96-008 LAMOUREUX, S. (1996).** Evidence for the last glaciation of Cornwall Island, Nunavut, Canada. Proceedings, 26th Arctic Workshop, March 16, 1996.

**ABSTRACT/DESCRIPTION:**

This paper presents initial field evidence for the age and nature of the last glaciation of

Cornwall Island in the central Canadian High Arctic. Several late Wisconsinan (LGM) High Arctic ice reconstructions have suggested that Cornwall Island was unglaciated, although there are numerous references to undated glacial deposits and landforms on Cornwall and the surrounding islands. The LGM ice margin in the central High Arctic has recently been challenged by England *et al.* (1995), who proposed that a LGM ice divide existed immediately southwest of Cornwall Island. Their model is based on observations that suggest a ridge of increased Holocene marine emergence through the central High Arctic, extending northeastward to western Ellesmere Island and southward to the Laurentides Ice Sheet. Recent fieldwork on southwest Devon Island also indicates LGM ice flow in Wellington Channel south from the proposed divide. The ice thickness at the proposed divide on Bathurst and northwest Devon Islands required to produce the observed ice flow features would almost certainly result in a balancing flow northward onto Cornwall Island. Ice limit and emergence data from the region north of the proposed ice divide remain sparse, which was the impetus for the field investigations presented here.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Cornwall Island, N.W.T.

**96-009 LISTON, M.L (1996).** Fire frequency based on carbon analyses. Research Report, Department of Renewable Resources, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Three sites were chosen for sediment coring in 1996; two near Km post 201 (60 km northwest of Fort Smith) and one near Sandy Lake (northern edge of the Park). Permafrost peat palsas were chosen, with bog to fen conditions as most of the lakes were either very shallow and have continual sediment overturn (destroying any annual laminations) or were inaccessible. Bulk sample profiles of the peat plateaus, evaporation pond, and fen peat were collected and shipped back to Edmonton.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Wood Buffalo National Park, N.W.T.

**96-010 LISTON, M.L. (1996).** Peatland fires: what's left after they burn? Proceedings, The Future of Our Environment, April 29-30, 1996.

**ABSTRACT/DESCRIPTION:**

In 1981, forest fires burned thousands of hectares of Wood Buffalo National Park. Not only were upland spruce and pine forests burned, but also large areas of wetland. Along Highway 5 running between Hay River and Fort Smith, part of a peatland burned leaving deep deposits

of ash material. It is unknown, however, what type of wetland and vegetation was the actual source of ash. The objectives of this study are to identify the vegetation and wetland type that acted as the source of these deposits. Laboratory ashing of fibric peats (*Sphagnum* spp. dominated), mesic and humic peats (*Carex* spp. and brown moss dominated) collected from the area suggests most of the ash deposits are derived from fibric *Sphagnum* dominated bog/poor fen peat. Similar ash layers can be found in peat plateau profiles from the local area of the park, and are now being used to reconstruct the fire frequency and vegetation changes of these plateaus.

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Wood Buffalo National Park, N.W.T.

**96-011 LUNN, N.J., STIRLING, I. and NOWICKI, S.N. (1996).** Distribution and abundance of seals in western Hudson Bay: annual progress report. Progress Report, Manitoba Hydro and Canadian Wildlife Service.

**ABSTRACT/DESCRIPTION:**

We flew at medium altitude, systematic, strip-transect survey for ringed and bearded seals over western Hudson Bay in early June 1996. The first structured seal surveys of western Hudson Bay were begun in 1994 and continued in 1995. In order to adequately address the degree to which interannual variation in the distribution and abundance of seals may occur, a 5 year project was initiated in 1996 whereby annual aerial surveys of western Hudson Bay would be undertaken. In 1996, the mean density of ringed seals hauled out was 1.34 seals/km<sup>2</sup> ice and the mean density of bearded seals hauled out was 0.03 seals/km<sup>2</sup> ice. Lower density and population estimates were obtained in 1996 compared with estimates from the survey conducted in 1995. Poor weather delayed the survey in 1996 by 6 days. Consequently, the lower density and population estimates obtained in 1996 may simply reflect that the peak of moult was over and therefore fewer seals were hauled out on the ice. Ringed seals preferred high ice cover habitat as has been demonstrated for western Hudson Bay, the Beaufort Sea, and the High Arctic. In 1996, as was observed in 1994 and 1995, the highest densities of ringed seals between Churchill, Manitoba and Arviat, Nunavut were recorded on the land fast ice.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Western Hudson Bay.

**96-012 MARION, C. (1996).** Development of permafrost peatlands in continental northwestern Canada. Progress Report, Canadian Circumpolar Institute 1995-1996.

**ABSTRACT/DESCRIPTION:**

In the boreal forest of continental western Canada, permafrost is restricted to ombrotrophic peatlands (bogs), where the insulative properties of the accumulated *Sphagnum* peat allow the development of permafrost under climatic conditions which do not otherwise support permafrost in other soils. Examination of subfossil plant remains obtained by coring representative sites, coupled with radiocarbon dating, will enable an evaluation of the timing and processes leading to permafrost development.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northwest Canada.

**96-013 MARSHAL, J.P. (1996).** Alternatives to density-dependent models of wolf-moose dynamics. Paper, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Here I argue that researchers are commonly biased when analysing predation data. Data for wolf-moose systems do not necessarily support theoretical models (hyperbolic or sigmoid) because linear models explain wolf predation data equally well I used the functional response data presented by Messier (1994), and the numerical response model of Fuller (1989), to construct an empirical model of wolf predation. I fit a linear model to the functional response data and found that the fit was better than proposed theoretical models. Linear models produced anti-regulatory wolf predation at low moose densities. I simulated a moose population by with a randomly chosen annual growth rate that varied between 15 percent and 20 percent per year. This simulated the effects of mortality from harvest, bear predation, severe weather, and changes habitat. The simulated moose population usually persisted. The density changed as a random walk that varied between 0.2 and 1.0 moose/km<sup>2</sup> over 500 years. When moose densities dropped below 0.2 moose/km<sup>2</sup>, anti-regulation resulted in an extinction. A possible scenario to explain extinctions is that wolf predation could cause them at a local scale, but populations continue to persist because moose recolonize from nearby areas. More generally, the data on wolf-moose dynamics do not support one Theory of population dynamics over other theories.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**96-014 MARSHAL, J.P. (1996).** Persistence of moose at low densities without density-dependent wolf predation. Paper, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

I simulated wolf and moose population dynamics using the wolf predation model presented in an earlier manuscript (Does predator-prey theory describe the dynamics of wolves and moose?). The predation model was based on linear numerical and functional responses. My goal was to create a system that would allow for persistence of moose over time, and to look for conditions that would allow for that persistence, even with high predation rates and regulatory predation at low moose densities. This simulation suggested that persistence is possible if: 1) the moose population is spatially divided into sub-population; 2) some of the sub-population exists in high-quality habitat, have high productivity, and have high potential growth rates; 3) wolves concentrate on only the high-density, high-quality part of the subpopulation; and 4) poor-quality habitats that sustain low densities of moose act as a refuge from predation.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**96-015 MARSHAL, J.P. (1996).** Statistical analysis and modelling of data from wolf-moose systems. Final Report, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

This study incorporated the Fish and Wildlife data with published data to address some common assumptions made by wolf-moose researchers when evaluating the dynamics between predator and prey. These assumptions have to do with the shapes of relationships of wolf functional and numerical responses to moose, and what these mean to the perceived dynamics wolves and moose in natural systems and consequently how to manage those systems.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**96-016 MARSHAL, J.P. and BOUTIN, S. (1996).** A power analysis of moose functional responses. Paper, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

Knowing the shape of a functional response is important in determining whether wolf predation on an ungulate population will have the potential to regulate that population. We used simulated data sets based on wolf-moose predation data to evaluate how easily a type II functional response can be distinguished from a type III functional response, and we determined the sample size necessary to attain a power of 80 percent. We found that our ability to distinguish the 2 functional response types for wolves was very poor, due to the low



sample size and high variance that usually accompany large mammal predation studies. Because of this low power, biologists should consider alternatives to functional response studies when trying to determine the effect of wolves on moose dynamics.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**96-017 MARSHAL, J.P. and BOUTIN, S. (1996).** Does existing predation-prey theory describe the dynamics of wolves and moose? Paper, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

We re-analysed functional and numerical response data from Messier (1994) for wolves preying on moose, and found that linear models and data transformation allowed for better statistical fit of the data than did hyperbolic models. These response models produced a predation model that was anti-regulatory at low moose densities, but allowed for a net increase in moose density if population growth rates in the absence of wolf predation and densities were greater than 20 percent and 0.15 moose/km<sup>2</sup>, respectively. Changes in the growth and predation due to annual variation in environmental factors could affect the amount of net growth in a moose population, resulting in variation in the growth rates and densities of moose. We suggest that functional responses could be linear with a positive intercept if wolves quickly increase their kill rates from zero as moose begin to become available, and if wolves show surplus killing and partial prey consumption at very high densities of moose. Evidence for a plateauing numerical response is questionable because studies that claim that wolf populations are limited at high densities though social constraints observed such constraints when food had become scarce, and so conclusions that density itself limits are confounded by the effects of changing food supply.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Yukon.

**96-018 ROBERTSON, S. (1996).** Recent glacial and sea level history of the Eugenie and Dobbin Bay - Ellesmere Island. Paper, Department of Earth and Atmospheric Sciences, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The main focus of this research was to determine the age of deglaciation and to reconstruct the sea level history in the valley. Two other large features were also looked at in greater detail in an attempt to reconstruct the Holocene history. These two features included a large

delta complex which marks a relict high sea level and a large thrust-block moraine located along the margin of the Eugenie glacier. This moraine is a significant feature as it marks the Holocene terminal portion of the ice. As well, the moraine has shoreline notches along its entire length.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Ellesmere Island, N.W.T.

**96-019 ROBERTSON, S. (1996).** The Holocene history at the head of Dobbin Bay, eastern Ellesmere Island. Paper, Department of Earth and Atmospheric Sciences, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The research focused on the Holocene history of Dobbin Bay, Ellesmere Island. Dobbin Bay is located on the east coast of Ellesmere Island. In order to complete this research it was necessary to spend two months researching the sediments and landforms present at the head of the bay. This research was completed by studying a number of different features and areas. The first area of research focused on determining the position of the relict sea levels throughout the valley. The second area of research involved describing and sampling a large relict delta. This research focused on recording the sediments and the stratigraphy of the delta. The third area of research focused on a large moraine present within the valley.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Ellesmere Island, N.W.T.

**96-020 ROSS, J.M. (1996).** Preliminary discussion of the archaeobotanical remains of a Norse Farmstead in the Western Settlement, Greenland. Proceedings, Seventh Annual Alberta Anthropology Graduate Student Conference, February 9-10, 1996, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The Viking Age spanned from the eighth century to the twelfth century AD and within this time period the Vikings explored, traded, plundered and settled as farmers. It is this last element of the Viking period that is overlooked by the general public although seeking new farm lands was perhaps one of the key motivations for the Vikings to leave their Scandinavian homelands. Possibly the most marginal area settled, Greenland exemplifies the furthest western colony of the Norse Vikings. An archaeological site (Garden Under Sandet) in the Western Settlement provides a case study of the environment that the Norse Greenlanders encountered, the plants that they exploited and their agricultural adaptive strategies.

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Greenland.

**96-021 ROSS, J.M. (1996).** Sheep droppings. How much do they tell us about the continuity and collapse of Garden Under Sandet, Western Settlement Greenland. Paper, Conference Canadian Archeological Association, May 4, 1996, University of Alberta.

**ABSTRACT/DESCRIPTION:**

The Farm site, Garden Under Sandet (GUS) is located in the Western settlement, Nuuk Community, Greenland and dates between the 10th and 13th centuries. The extraordinary organic preservation at this site provides an excellent opportunity to investigate archaeobotanical remains from situations within the farmstead. This paper provides a brief cultural background for the Western Settlement and the GUS-farmstead as well as presenting some of the preliminary archaeobotanical results. This archaeobotanical investigation focuses on two types of samples: sheep droppings from the byre to shed light on the animal husbandry practices and sediment layers which are associated with *landnam* to determine the vegetation that the Norsemen encountered upon their arrival.

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Western Settlement Greenland.

**96-022 TALLMAN, R.F., TONN, W.M. and HOWLAND, K.L. (1996).** Life history variation of inconnu (*Stenodus leucichthys*) and burbot (*Lota lota*), lower Slave River, June to December 1994. Research Report, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

These movement patterns signify that inconnu may transfer contaminants over a large area including Great Slave Lake whereas burbot would concentrate contaminants locally in the lower Slave River and its delta. To determine the life cycle and demographic characteristics of the inconnu, *Stenodus leucichthys*, and burbot, *Lota lota*, in the Slave River, Northwest Territories, we sampled between June and December 1994. Inconnu are migratory utilizing the Slave River for spawning. They were most abundant in the river in late September and October. Based upon the gonadosomatic index, inconnu probably spawn in mid-to-late-October in the Slave River. Burbot appear to be highly sedentary in the open water season because few were caught until December under ice cover. Inconnu had faster growth rates and earlier age-at-maturity (ages 5-7 for males and 7-9 for females) than more northerly inconnu populations. In contrast, burbot matured later (age 5) and grew more slower than other populations. Inconnu mean fecundity-at-age was between 108,086 to 124,493 eggs per female. Based on the demographics of the two species in the Slave River, inconnu would be

more vulnerable to environmental change.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Slave River, Great Slave Lake, N.W.T.

**96-023 TALLMAN, R.F., TONN, W.M. and HOWLAND, K.L. (1996).** Migration of inconnu (*Stenodus leucichthys*) and burbot (*Lota lota*), Slave River and Great Slave Lake, June 1994 to July 1995. Research Report, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION**

To determine the timing of movements and relative abundance of burbot, *Lota lota*, and inconnu, *Stenodus leucichthys*, on the lower Slave River north of the 60th parallel, we sampled on a regular basis using gillnets from June to November 1994. Movement patterns in time and space in the Slave River and Great Slave Lake were determined by radio-tagging of 24 inconnu and 16 burbot in the fall of 1994. Tracking was carried through the fall of 1994 through to July 1995. Inconnu entered the Slave River system from Great Slave Lake in August and attained peak catch-per-unit-effort (CPUE) during the first two weeks of September. By November they had left the system. Burbot CPUE did not increase substantially, therefore, no discernable pattern of movement was recognized from catches. Radio-tagged inconnu stayed in the Fort Smith area of the river until late October when they migrated out of the system into Great Slave Lake. Migrations in Great Slave Lake appeared to be geographically extensive. From January to the end of August 1995, all inconnu were captured or detected by radio telemetry in Great Slave Lake, only no inconnu were detected or captured in the Slave River. Extensive floy tagging programs conducted by the Department of Fisheries and Oceans corroborate these observations for inconnu in Great Slave Lake. Burbot appeared to be relatively sedentary and probably escaped detection by residing in deep holes of the river and the river delta.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Slave River, Great Slave Lake, N.W.T.

**96-024 TALLMAN, R.F., TONN, W.M., HOWLAND, K.L. and LITTLE, A. (1996).** Synthesis of fish distribution, movements, critical habitat and food web for the Lower Slave River north of the 60th parallel: a food chain perspective. Research Report, Northern River Basins Study Project, Department of Biology, University of Alberta.

**ABSTRACT/DESCRIPTION:**

This report brings together and synthesizes the available information on fish distribution,

movement critical habitat and food web for the lower Slave River north of the 60th parallel. The report is composed of seven major sections. The first section discusses background information, the original relevant questions posed by the NRBS, and three general models of the function of larger rivers. The second section gives a description based on the literature of the environment in the lower Slave River including information on geography and surrounding habitat, climate, primary productivity and invertebrate faunal composition. The seasonal climatic variation is great and this results in striking changes in the primary productivity and invertebrate faunal composition. The third section considers the distribution and abundance of fishes in time and space to provide a context for the interpretation of the findings of contaminants studies. Radio-telemetry and floy-tagging studies of harvested fish species, such as inconnu, burbot, lake whitefish, walleye are synthesized in section four to provide information on the range of movement in and out of the lower Slave River. The demographic characteristics of inconnu, burbot, lake whitefish, lake cisco, goldeye, northern pike, flathead chub, longnose sucker and walleye are examined in section five. Section six summarizes the available information on the diets of the major fish species in the Slave River and Delta in order to construct a piscine food web. Finally, section seven provides a summary of the major findings and knowledge gaps uncovered by the synthesis.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Slave River, N.W.T.



**UNIVERSITY OF BRITISH COLUMBIA**

**96-025 ARII, K. (1996).** Factors restricting plant growth in a boreal forest understorey: a field test of the relative importance of abiotic and biotic factors. Thesis, Department of Botany, University of British Columbia.

**ABSTRACT/DESCRIPTION:**

This study tests some of the conflicting predictions made by Grime (1977, 1979) and Tilman (1982, 1988) on how competition intensity changes along a gradient of nutrient availability. This was tested by applying three levels of nutrients (fertilizer treatments) and by varying the amount of neighbours present (competition treatments) in a factorial design using five common herbaceous species found in the boreal forest understorey (*Achillea millefolium*, *Anemone parviflora*, *Festuca altaica*, *Lupinus Arcticus*, *Mertensia paniculata*). Competition Intensity indices (CI) were calculated from the final biomass and leaf number for each species at all fertility levels. Addition of fertilizer significantly increased biomass and leaf number of *A. Millefolium* and *F. Altaica*. *Anemone parviflora* had high mortality in fertilized plots, while *L. Arcticus* and *M. paniculata* did not respond to fertilizer treatments. None of the species responded significantly to the varying amounts of neighbours present in the natural habitat. CI values were not significantly different from zero at any of the fertility levels for three out of the four species used to calculate CI. The results support neither of the original predictions made by Grime nor Tilman. However, the lack of response by these species is consistent with another of Grime's predictions based on his arguments about the evolution of stress-tolerance: i.e. his so-called 'stress-tolerant' species adapted to live in habitats of extremely low resource availability.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Kluane, Yukon.

**96-026 DLOTT, F. (1996).** Components of regulation of boreal forest understorey vegetation: a test of fertilizer and herbivory. Thesis, Department of Botany, University of British Columbia.

**ABSTRACT/DESCRIPTION:**

This study tests the predictions of two different hypotheses of trophic organization the 'bottom-up' and 'top-down' hypotheses respectively using plants in the boreal forest understorey. The experiment manipulated plant resource levels by fertilization and consumer levels (vertebrate herbivory rate) using exclosures, and monitored the response of transplanted seedlings and the leaf area of the established vegetation. Survival and growth transplants was poorest at the highest fertilizer levels; a result not predicted by either 'bottom-up' or 'top-down'. Herbivore exclosures had no significant effects on survival or growth at

low or moderate herbivore densities; fertilizer addition did not increase leaf area. These results suggest that the resources added by fertilization and that the herbivores excluded were not limiting at these herbivore densities. At high herbivore densities transplant survival and growth was consistently greater inside exclosures which lends support to the 'top-down' hypothesis for seedling survival and performance, but leaf area did not significantly respond to either treatment but was greater inside exclosures especially when fertilized. A model of trophic relations in the boreal forest between understorey plants, their resources and their consumers should only include herbivores as a limiting factor when their densities are abnormally high and even then the 'top-down' hypothesis is supported only from transplant data and not from existing vegetation.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Yukon.

**96-027 WASHBROOK, K. (1996).** Negotiating the nature of nature: a cultural models approach to meaning, motivation and cooperative resource management in the Yukon. Thesis, Department of Anthropology and Sociology, University of British Columbia.

**ABSTRACT/DESCRIPTION:**

Yukon land claims settlements mandate that First Nations and the territorial government cooperatively manage renewable resources. As these groups are brought together in decision making, developing an understanding of culturally specific constructions of the non-human world and the ways in which these motivate managers will be necessary if conflict in management is to be avoided. This paper explores the usefulness of a cognitive approach for clarifying the ways in which shared cultural models for the environment motivate individuals to pursue different actions in resource management. In the Yukon, important, motivating models for First Nations and non-First Nations individuals appear to be, respectively, that *Nature is a set of social relationships* and *Nature is a system akin to the economy*. The influence of these models upon resource management is examined through the case study of an interaction over catch-and-release fishing regulations. §

**DISCIPLINE:** Resource Management.

**FIELDWORK LOCATION:** Yukon.



## CONCORDIA UNIVERSITY

**96-028 LAFRANCE, B. and VARGA, M. (1996).** Structural Studies of the Parker Lake Shear Zone and the Reilly Lake Shear Zone, Reindeer Lake. Paper, Geology Department, Concordia University.

**ABSTRACT/DESCRIPTION:**

The Parker Lake Shear Zone (PLSZ) and the Reilly Lake Shear Zone (RLSZ), northern Saskatchewan, are interpreted as northern splays off the Needle Falls Shear Zone, a major NE-trending shear zone within the Proterozoic Trans-Hudson Orogen. The Needle Falls Shear Zone separates infolded Proterozoic supracrustals and Archean basement rocks of the Wollaston Domain from the Wathaman batholith, a large continental-margin, magmatic arc to the south. To the northeast, where the Peter Lake Domain lies between the Wollaston Domain and the Wathaman batholith, the Needle Falls Shear Zone branched into three major faults: a northern fault segment, the PLSZ, and the RLSZ. <sup>2</sup> § Our conclusions differ from those of previous workers. We suggest that the RLSZ, the PLSZ, and the tectonic foliation in the Wathaman batholith are the product of a regional transposition event. The RLSZ and PLSZ are not dextral transcurrent shear zones.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northern Saskatchewan.



## UNIVERSITÉ LAVAL

**96-029 ALLARD, M., CARON, S. and BÉGIN, Y. (1996).** Climatic and Ecological Controls on Ice Segregation and Thermokarst: The Case History of a Permafrost Plateau in Northern Quebec. Rapport d'étude, Centre d'études nordiques, Université Laval.

### **ABSTRACT/DESCRIPTION:**

A reconstruction of the historical evolution of a permafrost plateau typical of the discontinuous permafrost zone was carried out at a site selected along the shore of Hudson Bay. The attempt was made by using data from four thermistor cables, cryostratigraphic data from 25 boreholes, repeated snow surveys, and dendrochronological analysis on 209 spruce trees over the flanks and the top of the plateau. Four cryostratigraphic layers make up the complete permafrost stratigraphy. Layer I is the active layer. Layer II is an ice-enriched layer composed mainly of aggradational ice near the top of the permafrost; annual thermal amplitude at that level is 8.5°C. Layer III contains a low volume of reticulated ice; thermal amplitude is considerably damped in this layer. And layer IV (350 cm to permafrost base) has a very high ice content made of lenses that get thicker with depth. §

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Manitounuk, Baie d'Hudson.

**96-030 BEAULIEU, N., ALLARD, M. et RUZ, M.H. (1996).** Évolution d'un rivage subarctique soumis au relèvement glacio-isostatique, Déroit de Manitounuk, Hudsonie. Papier, Département de géographie, Centre d'études nordiques, Université Laval.

### **RÉSUMÉ/DESCRIPTION:**

Le déroit de Manitounuk s'étire sur environ 60 km au nord de Kuujuaapik, sur la côte est de la mer d'Hudson. Il s'agit d'un bras de mer protégé par une chaîne d'îles allongées et animé par une dynamique propre à cause de la géologie du Quaternaire de ses rives, de la protection contre les vagues et les glaces de haute mer et du régime local des marées. Les apports d'eau douce de plusieurs petites rivières et la dynamique des masses d'eau en font un écosystème riverain unique sur cette côte. Les estrans de la rive est en particulier, comportent des marais fréquentés par la sauvagine. Le déroit de Manitounuk représente donc un environnement côtier diversifié et de haute valeur pour les populations autochtones. Bien qu'il ait fait l'objet de nombreuses études dans le cadre du projet avorté d'aménagement hydroélectrique de Grande-Baleine, l'évolution récente et actuelle des rives n'avait pas été analysée en détails. Les côtes de la mer d'Hudson subissent présentement une baisse du niveau marin relatif due au relèvement glacio-isostatique du continent. Le taux d'émergence de la côte dans la région est de l'ordre d'un mètre par siècle. Cependant, les études réalisées sur la rive est du déroit démontrent que la progression côtière n'est pas généralisée et que, bien au contraire, certains

secteurs en dépôts meubles ont connu des reculs importants au XXIème siècle. Les conditions périglaciaires découlant du climat (continental Arctique l'hiver et subarctique maritime le reste de l'année) influencent grandement les processus littoraux actifs dans le détroit de Manitounuk.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Détroit de Manitounuk, Baie d'Hudson.

**96-031 BEAULIEU, J., GAUTHIER, G. and ROCHEFORT, L. (1996).** "The growth response of graminoid plants to goose grazing in a High Arctic environment". Journal of Ecology, 84:905-914.

**ABSTRACT/DESCRIPTION:**

The response of plants to herbivory usually varies with the grazing regime experienced. We investigated (i) if the timing and frequency of grazing affected plant growth, (ii) if faeces deposition by herbivores stimulated plant growth, and (iii) if grazing affected the total nonstructural carbohydrate (*TNC*) reserves in the below-ground vegetation of two arctic graminoids, *Dupontia fisheri* and *Eriophorum scheuchzeri*. This study was conducted in polygon fens exposed to intense summer grazing by greater snow geese (*Chen caerulescens atlantica*) on Bylot Island (73°N) in the Canadian High Arctic. We manipulated the frequency (once or three times) and the timing (early, mid or late in the season) of grazing and faeces deposition in controlled grazing trials using captive goslings. Although ungrazed plants were taller than grazed ones at the end of the season, data on cumulative tiller elongation (net above-ground height defoliation in both species. However, neither grazing (presence or absence) nor its frequency affected the net above-ground primary production (*NAPP*) or the number of tillers at the end of the summer. Nitrogen concentration was highest in plants grazed three times, intermediate in those grazed once, and lowest in ungrazed plants. Timing of grazing and presence of goose faeces with or without grazing had no effect on plant growth. *Eriophorum* plants grazed three times had less *TNC* in their below-ground tissues than ungrazed plants, and the trend was similar in *Dupontia*. *Dupontia* and *Eriophorum* were able to compensate for leaves lost to grazing and to maintain production at a level similar to ungrazed plants, but at some cost (reduced below-ground reserves). The absence of an effect faeces on plant growth may explain the absence of a positive effect of grazing on *NAPP* (i.e. overcompensation) in this ecosystem.

**DISCIPLINE:** Biology

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**96-032 BERGERON, M. and VINCENT, W.F. (1996).** Relationships between microbial food web

components and the physical environment in subarctic lakes. Paper, Département de biologie, Université Laval.

**ABSTRACT/DESCRIPTION:**

Microbial food web structure was determined by fluorescence microscopy for samples from 23 sites in Northern Québec. Bacteria and picocyanobacteria were the numerical dominants in all samples, with concentrations in the range  $1-14 \times 10^8$  and  $1-39 \times 10^5$  cells  $l^{-1}$ , respectively. Picophytoplankton contributed up to 53 percent of the chlorophyll *a* biomass as measured by differential filtration. Flagellates dominated the nanoplankton community. Bacterial and nanoplankton abundance increased with increasing temperature, while phototropic picoplankton concentrations were independent of temperature. Heterotrophic picoplankton (bacteria) abundance correlated with the light attenuation coefficient (K) suggesting a relationship with dissolved organic carbon which may control light absorption in these lakes. Similarly, nanoplankton and flagellate concentrations were positively correlated with K. These observations underscore the importance of the microbial food web components in subarctic lakes and their close relationship with the physical environment.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**96-033 BOIVIN, S. (1996).** Reconstitution dendroécologique des conditions d'enneigement au Lac Bienville Québec subarctique. Mémoire de maîtrise, Faculté des lettres, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

L'étude des formes de croissance des arbres, résultant de conditions d'exposition variables, dans la région du lac Bienville a permis de poser un diagnostic sur les variations du régime nival au cours des deux derniers siècles. Les changements observés dans la répartition nivale se traduisent chez les arbres par la présence de diverses anomalies morphologiques (cicatrice, mortalité d'axe et surramification sous-nivale) et sont enregistrés par les cernes annuels de croissance. L'analyse dendroécologique d'un front forestier établi après feu survenu au début du XIXe siècle, en position riveraine, suggère d'abord une période de croissance difficile entre 1850 et 1860, alors que de nombreuses baisses du taux de croissance ont été observées et qui correspondraient, pour plusieurs individus, à la percée de la couverture nivale. Par la suite, un changement dans le régime des précipitations neigeuses à la fin du XIXe siècle, appuyé par la datation des diverses réactions morphologiques (cicatrice et mortalité d'axes), aurait été l'élément déclencheur au développement de tiges supra nivales modifiant de nouveau la répartition de la couverture de neige. À l'exception des décennies 1920 à 1940, les conditions semblent avoir été favorables à une bonne croissance au cours du XXe siècle. Enfin, des relevés concernant la couverture de neige ont aussi permis de montrer une relation entre la répartition de certaines communautés végétales et l'épaisseur de neige. Le développement

spatio-temporel de cette bordure forestière a donc été influencé par la distribution de la couverture de neige, résultant des changements du régime de précipitation et de l'évolution de la frange forestière elle-même.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec nordique.

**96-034 CLOUTIER, D. (1996).** Effets des variations de viscosité de l'eau de mer sur les transports sédimentaires littoraux, Kuujjuaraapik, Nouveau-Québec. Thèse, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Les variations de la viscosité cinématique des masses d'eau côtières de la plage de Kuujjuaraapik sont provoquées, au mois d'août et de novembre, par les variations quotidiennes de la direction des vents. De plus, en novembre, la baisse saisonnière des températures de l'air a aussi pour effet d'augmenter la viscosité de l'eau. L'augmentation quotidienne et saisonnière de la viscosité cinématique des masses d'eau entraîne une diminution des taux de transport sédimentaire longitudinaux côtiers. La viscosité plus élevée des masses d'eau rend plus difficile la remobilisation des sédiments dans la zone de déferlement, lorsque la viscosité du fluide passe de valeurs de 1,20 - 1,29 à 1,60 - 1,69 x 10<sup>-6</sup>m<sup>2</sup>s<sup>-1</sup>, ce qui provoque une diminution des taux de transport en suspension. De plus, la viscosité élevée du fluide limite la mise en suspension de particules de tailles grossières.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Kuujjuaraapik, Québec nordique.

**96-035 CRÊTE, M. and MANSEAU, M. (1996).** "Natural regulation of cervidae along a 1000 km latitudinal gradient: change in tropic dominance". Evolutionary Ecology, 10:51-62.

**ABSTRACT/DESCRIPTION:**

The biomass of forage, herbivores (caribou and moose) and predators (wolf) were estimated for four assemblages of large mammals along a latitudinal gradient in the Québec-Labrador peninsula and related to predictions made by two types of multi trophic level models. Wolves were present in three study areas, but they had been extirpated in the last one. Annual production of preferred forage exhibited a clear north-south increase for moose, but not for caribou. Neither the herbivore nor predator biomass increased along the latitudinal gradient: the highest herbivore biomass occurred in the wolf-free area and in the northernmost site occupied by migratory caribou. Availability of forage per herbivore was the greatest in the moose-wolf and the caribou-moose-wolf assemblages. The observed data supported the multi

trophic level model incorporating classical predator-prey relationships and producing stepwise accrual of trophic level biomass with increasing food chain length. In the northernmost site, the system was limited to two functional trophic levels and caribou were regulated by summer forage. Three functional trophic levels appeared to exist in the central study area where caribou and moose were preyed upon by wolves. Both herbivores were at very low density, the first one due probably to its poor adaptation to predation and the second because of an unproductive range. In the southernmost site, moose were clearly regulated by predation and kept much below the carrying capacity. With the extirpation of wolves in the last study area, moose were regulated by forage and the density exceeded that in the moose-wolf system by seven times even in a less productive range. Caribou, having primarily evolved under resource limitation, is replaced by a cervid better adapted to predation, the moose, in more productive “three-link” ecosystem.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec and Labrador.

**96-036 DUFOUR, M. (1996).** Étude dendrochronologique de l'influence de l'exposition sur La croissance de l'épinette noire au lac Bienville, Québec subarctique. Mémoire de baccalauréat, Faculté des lettres, Département de géographie, Centre d'études nordiques, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

L'épinette noire occupant les îles du lac Bienville exposées à de longs fetchs ont une croissance ralentie. Le but du mémoire est de savoir si la taille des îles peut influencer l'effet du vent sur la densité du couvert forestier et, par le fait même, sur la croissance des arbres. La présence d'arbres à croissance radiale limitée en périphérie des îles étudiées indique un effet certain des vents. À l'aide d'une analyse dendrochronologique, il a été possible d'établir l'effet du vent sur la croissance des arbres selon leur localisation sur l'île, leur position dans le peuplement et selon la superficie de ces îles. Bien qu'une superficie moindre de l'île diminue la longévité des épinettes et qu'une position en arrière plan dans le peuplement augmente la symétrie de la tige, ce sont surtout les vents dominants provenant de l'ouest qui limitent la croissance des épinettes noires bordières.

**DISCIPLINE:** Géographie physique

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec nordique.

**96-037 FALLU, M.A. and PIENITZ, R. (1996).** Distribution of freshwater diatoms in northern Québec (Canada), and development of a model for paleoclimatic reconstructions. Paper, Département de géographie, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

The freshwater diatom flora of northern Québec (>1,000,00 km<sup>2</sup>) remains largely unknown. The main purpose of this project is to study the distribution of freshwater diatoms preserved in the surficial sediments of 60 lakes. The latter are located along a latitudinal transect (from 49° to 59°N along the eastern shores of James Bay and Hudson Bay) that includes steep climatic and vegetational gradients, showing significant changes in diatom assemblage composition and water chemistry across the treeline. The development of a surface sediment 'calibration' or 'training' set is a powerful method for determining diatom species-environmental relationships and will allow us to develop diatom-based models for the reconstruction of environment variables that are related to climate.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** James Bay and Hudson Bay, Northern Québec.

**96-038 GAGNE, M. et HOULE, G. (1996).** Écologie comparée de la colonisation des dunes bordières de Poste-de-la-Baleine, Québec subarctique, par *Elymus mollis* et *Honckenya peploides*. Papier, Centre d'études nordiques, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Deux variables (formations superficielles et structures végétales) ont été introduites numériquement à l'intérieur d'un SIG afin d'élaborer une carte de distribution du pergélisol à l'échelle régionale. Une seconde carte de la distribution du pergélisol réalisée par photo-interprétation et levées de terrain a pu être comparée avec celle obtenue à l'aide du SIG. Les deux cartes concordent à un taux de 92%. L'analyse des variables a permis de constater l'importance marquée des formations superficielles sur la répartition du pergélisol. Dans la région pilote, la nature du sol doit être considérée comme la variable la plus significative et dans les tills à matrice fine. La physiologie végétale, par le biais du contrôle qu'elle exerce sur le couvert nival, s'avère la principale variable complémentaire permettant de cartographier précisément la présence de pergélisol à l'intérieur des zones de sédiments fins.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Détroit de Manitousuk, Baie d'Hudson.

**96-039 LAURION, I. and VINCENT, W.F. (1996).** Does dissolved organic matter control spectral balance in high latitude lakes? Paper, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

UV-B is the most damaging component of solar radiation while UV-A has been implicated



in repair as well as damage processes. Therefore, it is the ratios of different UV and visible wavebands that are especially important in biological processes and the balance between damage and repair. The striking non-linear relationship between biological effect and wavelength in the UV region of the solar spectrum led us to search for a more accurate definition of UV spectral balance in the upper layers of lakes. Different wavelengths are attenuated at different rates in the water column, and the spectral distribution of solar radiation shifts towards longer wavelengths at depth. Fulvic and humic acids can dominate the absorbency of UV light in water, but absorbency by phytoplankton can become important at high Chlorophyll (Chl) *a* concentration. We found that for lakes with low Chl *a* content, DOM is also largely responsible for the attenuation of PAR and therefore controls the UV/PAR ratio as well as UVA-UVB spectral balance in relation to depth. Using measurements from a broad range of Arctic and subarctic lakes, we developed models that define spectral balance as a quantitative function of DOM parameters.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northern Québec.

**96-040 LAVOIE, C. and PAYETTE, S. (1996).** “The long-term stability of the boreal forest limit in subarctic Québec”. *Ecology*, 77:1226-1233.

**ABSTRACT/DESCRIPTION:**

Using black spruce (*Picea mariana*) macro fossil remains at the forest-tundra to tundra transition in northern Québec, Canada, we address the question: did the boreal forest limit shift in unison with climate change during the Holocene? Logs buried in peatlands, charcoal in the organic soil layers on well-drained sites, and dry peat underlying stunted clonal spruce were sampled across a 60-km transect south and north of the modern forest limit. Of 146 spruce logs sampled south of the modern forest limit, 34 were <sup>14</sup>C dated between 4580 and 1540 yr BP, and 34 additional logs were cross-dated with <sup>14</sup>C dated spruces (3010-1540 yr BP) using diagnostic tree rings. South of the forest limit charcoal with abundant spruce fragments was widespread in dry-mesic sites and dated between 1920 and 1140 yr BP. No spruce logs or charcoal were found in all the surveyed sites north of the forest limit. The residence time of humified peat confined to the area occupied by tundra clonal spruces ranged between 3040 and 630 yr BP. The absence of spruce macro fossils in the tundra zone, together with the geographic coincidence of the charcoal limit and forest limit, strongly suggests that the forest remained stable during the last 200-3000 yr BP. Old-aged peat produced by tundra spruces is additional evidence for the stability of the forest limit. Because only spruce is able to accumulate such a thick organic layer, the <sup>14</sup>C dates of basal peat indicate the spruce clones developed continuously in the absence of external disturbance at least over the last 3000 yr BP. The stability of the forest limit during warm (~2000 yr BP, medieval times, and this century) and cold (~3000 and 1300 yr BP, and the Little Ice Age) periods of the late Holocene demonstrates that mechanisms allowing forest limit advance or

retreat are not easily triggered by climatic change.

**DISCIPLINE:** Forestry.

**FIELDWORK LOCATION:** Northern Québec.

**96-041 LEPAGE, D., GAUTHIER, G. and REED, A. (1996).** “Breeding-site infidelity in greater snow geese: a consequence of constraints on laying date?” Canadian Journal of Zoology, 74:1866-1875.

**ABSTRACT/DESCRIPTION:**

We studied annual variation in the distribution of greater snow goose (*Chen caerulescens atlantica*) nests and colonies at a High Arctic breeding site (Bylot Island, Northwest Territories, Canada) from 1988 to 1994. Annual distribution and size of colonies within the study area were highly variable. The distance between colony centres in successive years ranged from 2.9 to 6.9 km ( $x = 3.9$  km), with no overlap of the areas occupied. Timing of snowmelt and nest-site availability were also variable. In some years, the area was snow-free at the time the geese arrived, whereas in others, snow persisted for up to 3 weeks after their arrival. However, even in the 3 years of earliest snowmelt (1988, 1993 and 1994), geese used markedly different nesting areas, in both lowland and upland areas. Geese nested in association with snowy owls (*Nyctea scandiaca*) in the 2 years that owls nested and their nesting success was markedly improved, probably because of the deterrent effect of owls on Arctic wolves (*Alopex lagopus*), the main nest predator. This suggest that protection from nest predators is an important determinant of nest-site selection. The lack of fidelity to a specific nesting location is unusual in geese. We suggest that large annual variability in timing of snowmelt, predation pressure, and availability of feeding areas during the pre-nesting period, combined with the need to lay at an optimal date because of the short Arctic nesting season, probably explain the low nest-site fidelity in this population.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Bylot Island, N.W.T.

**96-042 LEPAGE, D., GAUTHIER, G. et DESROCHERS, A. (1996).** Le rôle des parents dans la variation de croissance et de survie chez la Grande Oie des neiges (*Chen caerulescens atlantica*). Présentation, Congrès international francophone sur le comportement animal, Université Laval, Québec, juin 1996.

**RÉSUMÉ/DESCRIPTION:**

La croissance des jeunes oisons durant la période précédant l’envol est une composante critique de leur succès futur (survie et succès reproducteur). Parmi les facteurs qui affectent

la croissance, la date a deux éléments clés. Toutefois, la plupart des études qui ont examiné ces paramètres ne sont pas en mesure de séparer le rôle des facteurs de l'environnement (variation de la disponibilité de la nourriture, etc.) du rôle de l'habilité (phénotype) des parents à élever leurs jeunes. Afin de séparer ces deux éléments, nous avons manipulé des couvées (N=318 nids) juste avant l'éclosion et nous avons examiné l'effet de ces manipulation sur la croissance des jeunes. Nous avons conduit simultanément deux types d'échange de couvées en 1993 et 1994: (1) entre des nids hâtifs et des nids tardifs (4 jours de différence en moyenne) et entre des couvées de différentes tailles (2 oeufs de différence). Les oisons issus de ces nids ont été marqués à l'éclosion et ont été recapturés environ 5 semaines plus tard. Parmi les jeunes capturés, ceux éclos tôt ont eu une meilleure croissance que les éclos tard et les jeunes de couvées plus nombreuse ont eu une meilleure survie. La taille et la masse des oisons expérimentaux (après avoir contrôlé les autres effets) n'a pas été affecté par la manipulation de la date: le phénotype des parents adoptifs n'a pas affecté la croissance des jeunes. De même, les oisons des familles plus nombreuses ont eu une meilleure croissance, même si ils ont été élevés par des parents qui ont pondu ne joue pas un rôle important pour expliquer les variations de croissance associées avec la date d'éclosion ou la taille de couvée.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Île Bylot, T.N.-O.

**96-043 LEPAGE, H. and BÉGIN, Y. (1996).** "Tree-ring Dating of Extreme Water Level Events at Lake Bienville, Subarctic Québec Canada". Arctic and Alpine Research, 28:78-85.

**ABSTRACT/DESCRIPTION:**

Disturbances in shoreline forest margins during the past century were dated at Lake Bienville, Quebec, using various dendroecological indicators. Trees in upper shore positions were disturbed by waves and ice erosion. These geomorphic events were dated using compression wood, ice scars, and traumatic annual rings. Trees that established during favorable episodes in the 19th century have been severely destabilized by shoreline disturbances in most decades since 1881; 1881-83, 1912, 1922, 1936, 1947-48, 1958-59 and 1974-79. The age structure of shoreline shrubs indicates recent colonization associated with low lake levels (gauged since 1974). The results support a hypothesis of shoreline disturbances caused by early snowy winters and subsequent high lake levels.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Lake Bienville, Northern Québec.

**96-044 MANSEAU, M. (1996).** Relation réciproque entre les caribous et la végétation des aires d'estivage: le cas du troupeau de caribous de la Rivière George. Thèse, Département

de biologie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

La présente étude démontre que la mauvaise condition physique des femelles en lactation du troupeau de caribous de la Rivière George, ainsi que la faible croissance des faons en été sont dues à la faible disponibilité de la ressource alimentaire, et que cette faible disponibilité de la ressource est le résultat d'une utilisation répétée du milieu par les caribous au cours des années passées. Sur l'ensemble de l'aire d'été (plus de 20 000 km<sup>2</sup>), on estime que les biomasses de lichens et de plantes vasculaires ont été réduites respectivement de 96 et 25 pour-cent. Dans la toundra arbustive, le tapis de lichens est disparu tandis que dans les bétulaies, le recouvrement, la biomasse de feuilles et la hauteur de la strate arbustive ont été réduits de près de la moitié. En conséquences, le régime alimentaire estival des caribous est composé de plantes de moindre qualité (forte proportion de graminées) et, d'après le modèle de Kremsater *et al.* (1989) et Hovey *et al.* (1989), la forte teneur en fibres du régime alimentaire serait maintenant la principale contrainte limitant leur prise alimentaire en été. Pour les caribous s'alimentant au sein d'agrégations de fortes densités (> 300 caribous km<sup>-2</sup>), le modèle prédit que la prise alimentaire des animaux serait soumise à une contrainte de temps. Chez ces animaux, le temps disponible à l'alimentation est limité et une relation négative entre la prise alimentaire et la densité des agrégations suggère qu'il y a interférence entre les individus. Ces coûts associés à la formation de larges agrégations pourraient aussi résulter de la faible disponibilité de la ressource sur l'aire d'été.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Rivière George, T.N.-O.

**96-045 MANSEAU, M., HUOT, J. and CRÊTE, M. (1996).** "Effects of summer grazing by caribou on composition and productivity of vegetation: community and landscape level". *Journal of Ecology*, 84:503-513.

**ABSTRACT/DESCRIPTION:**

Changes in demography and studies on physical condition of the Rivière George caribou (*Rangifer tarandus*) herd have suggested that its size may be primarily regulated by the amount of forage available on the summer range. We therefore document the impact of grazing and trampling on composition and productivity of two plant communities, the shrub tundra and stands of dwarf birch, within this range. Ungrazed sites were rare, but four previously located small areas were used as control sites. For the shrub tundra, the lichen mat was absent in grazed sites and ground previously occupied by lichens was either bare, covered by fragments of dead lichens and mosses or recolonized by early succession lichen species. Ground cover of shrubs not eaten by caribou was lower in grazed sites than in ungrazed sites, and coverage of graminoids, forage shrubs and forbs did not differ significantly between grazed and ungrazed sites. In stands of dwarf birch grazed by caribou, ground cover and leaf

biomass of *Betula glandulosa* was significantly lower than in ungrazed sites. Productivity of forage plant species over the summer range was estimated at 22.5 gm<sup>-2</sup> year<sup>-1</sup> in an ungrazed condition compared to 10.3 gm<sup>-2</sup> year<sup>-1</sup> when grazed. At the landscape level, caribou have fragmented the distribution of their food resource by reducing biomass of shrub tundra and stands of dwarf birch to a very low level. The serious negative impact of migratory ungulates on plant productivity of their summer range may be explained by characteristics of the vegetation and the high carrying capacity of winter compared to summer ranges.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Rivière George, N.W.T.

**96-046 MÉNARD, E., ALLARD, M. et BÉGIN, Y. (1996).** “Essai de cartographie du pergélisol discontinu à l'aide d'un SIG: Déroit de Manitousuk, Québec nordique, Canada”. Permafrost and Periglacial Process, 8:237-244.

**RÉSUMÉ/DESCRIPTION:**

Deux variables (formations superficielles et structures végétales) ont été introduites numériquement à l'intérieur d'un SIG afin d'élaborer une carte de distribution du pergélisol à l'échelle régionale. Une seconde carte de la distribution du pergélisol réalisée par photo-interpretation et relevés de terrain a pu être comparée avec celle obtenue à l'aide du SIG. Les deux cartes concordent à un taux de 92%. L'analyse des variables a permis de constater l'importance marquée des formations superficielles sur la repartition du pergélisol. Dans la région pilote, la nature du sol doit être considérée comme la variable la plus significative. Les zones pergélisolées se retrouvent presque exclusivement dans les silts argileux et dans les tills à matrice fine. La physionomie végétale, par le biais du contrôle qu'elle exerce sur le couvert nival, s'avère la principale variable complémentaire permettant de cartographier précisément la présence de pergélisol à l'intérieur des zones de sédiments fins.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Déroit de Manitousuk, Québec nordique.

**96-047 PARADIS, G. (1996).** Reconstruction dendrochronologique des variations de la nappe phréatique dans les sols riverains au Lac Bienville, Québec nordique. Maître ès arts présenté, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Par une analyse dendrochronologique de l'épinette noire (*Picea mariana* [Mill.] BSP), cette recherche retrace les oscillations de la nappe phréatique dans les sols riverains au Lac Bienville au Québec nordique. Ces variations se produisent parallèlement aux fluctuations du

niveau du lac. Reposant sur les variations de la larguer des cernes annuels, l'étude conclut à l'incidence de hauts niveaux d'eau presque à toutes les décennies: 1855-57, 1862, 1876, 1882-85, 1892-94, 1912, 1921-23, 1926, 1933, 1936, 1949-50, 1956, 1965, 1971, 1974-78 et 1981. De plus, des bas niveaux d'eau se seraient produits vers 1853, 1865, 1870, 1873, 1878, 1907 et 1985. Les hydrogrammes annuels de 1975 à 1992 corroborent les résultats obtenus par l'analyse dendrochronologique. La croissance des arbres suggère un changement des conditions hydroclimatiques régionales après 1880, favorisant la récurrence de hauts niveaux d'eau mis en évidence ailleurs au Québec subarctique.

**DISCIPLINE:** Biologie.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Lac Bienville, Québec nordique.

**96-048 ROUSSEAU, L. (1996).** Étude stratigraphique de paises et de plateaux palsiques, Rivière Boniface, Québec Subarctique. Maître ès arts présenté, Département de géographie, Université Laval.

**RÉSUMÉ/DESCRIPTION:**

Les paises hautes et les plateaux palsiques bas constituent les formes périglaciaires les plus fréquemment rencontrées dans la région de la rivière Boniface. Ces deux types de formes présentent une structure interne constituée d'un réseau stratifié de lentilles de glace de ségrégation développées à l'intérieur d'un noyau gelé de silts argileux. Le développement de lentilles de glace a provoqué des soulèvements responsables de l'allure actuelle de ces formes. Malgré des processus de formation semblables, le fort soulèvement de la paise est essentiellement attribuable à une épaisseur beaucoup plus importante de la couche de matériaux fins dans laquelle les lentilles de glace ont pu se former. Le contexte géomorphologique est responsable de ces écarts d'épaisseur, les paises se retrouvent principalement au fond d'étroites vallées rocheuses dans lesquelles ont pu s'accumuler une importante couche de sédiments fins, alors que les plateaux palsiques reposent plutôt dans de larges vallées évasées et peu profondes.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Rivière Boniface, Québec nordique.

**96-049 TANG, E.P.Y., TREMBLAY, R. and VINCENT, W.F. (1996).** Cyanobacterial dominance in the polar regions: are they adapted to the low temperature environment? Paper, Département de biologie, Centre d'études nordiques, Université Laval.

**ABSTRACT/DESCRIPTION:**

Although it is generally believed that cyanobacteria have high temperature optima for growth

(> 20 °C), the mat-forming cyanobacteria dominate in many types of lakes, streams and ponds in the Arctic and Antarctic. We studied the growth ( $\mu$ ) of 28 species of cyanobacteria isolated from the Arctic, Antarctic and sub-Arctic to investigate whether they are a) adapted to the low temperature *i.e.* psychrophilic or b) tolerant of the low temperature of the polar regions *i.e.* psychrotropic. The cyanobacteria were cultured at 7 different temperatures (5-35°C at 5°C intervals), with continuous illumination of 200  $\mu\text{mol quanta m}^{-2} \text{s}^{-1}$ . Among 19 species of cyanobacteria that we have analysed so far, the temperature optima for growth range from 15-35°C with an average of 19.4°C. These results imply that polar cyanobacteria are psychrotrophs, not psychrophiles. However,  $\mu$  changes rapidly with temperature with an average  $Q_{10}$  of 4.33. This indicates that the cyanobacteria make use of the brief warm period of the polar summer to accumulate biomass. Low growth rates at all temperatures and the high optimal temperature suggest that the cyanobacteria are not genetically adapted to the polar temperature. Other competitive advantages such as tolerance to high UV and desiccation may contribute to their dominance in polar aquatic ecosystems.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** N.W.T.





## UNIVERSITY OF MANITOBA

**96-050 DROBOT, S.D., BARBER, D.G. and YACKEL, J.J. (1996).** Seasonal evolution of passive microwave signatures on snow covered first year sea ice. Paper, Centre for Earth Observation Science, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

The objectives of this experiment are to link the seasonal evolution of passive microwave radiometer signatures to micro scale physical and electrical properties of the snow cover, as well as aspects of the surface energy balance. This project will allow analysis of SIMMS'95 in situ radiometer observations relative to surface energy fluxes between April and June (spring transition). Specifically, this project will: 1. Monitor the seasonal evolution of (i) snow and ice properties, (ii) climate variables, and (iii) passive microwave radiometer signatures. 2. Investigate the statistical interrelationships amongst items i, ii, and iii of point 1. above. In this research, snow and ice properties collected include temperature, snow density, snow salinity, and snow wetness; photosynthetically active radiation (PAR) and reflective shortwave (K) represent the climatological measurements; and brightness temperatures were collected in V and H polarizations.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Lowther Island, N.W.T.

**96-051 DROBOT, S.D., BARBER, D.G. and YACKEL, J.J. (1996).** C-ICE 96 Field Summary. Paper, Centre for Earth Observation Science, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

The Collaborative Interdisciplinary Cryospheric Experiment (C-ICE) is a multi-year field experiment that has many individual projects, each with autonomous goals and objectives. The science conducted has either directly evolved from research relating to one of four general themes: i) sea ice energy balance; ii) numerical modelling of atmospheric processes; iii) remote sensing of snow covered sea ice; iv) ecosystem studies. The C-ICE field program provides the surface data required to develop an understanding of the process linkages operating in an environment typical of fast ice conditions in the Canadian Arctic Archipelago. A modelling component within C-ICE operates in conjunction with the field activities, although the modelling aspects will assume greater importance as the existing field data are analysed. The principal objective of this subgroup is to integrate the field data within numerical models of the primary processes operating in our area of interest, for the expressed purpose of 'scaling up' observations to more regional scales.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** N.W.T.

**96-052 DROBOT, S.D., BARBER, D.G. and YACKEL, J.J. (1996).** Geophysic, dielectrics and emissivities and their relationship to snow water equivalence (SWE) estimation using SSM/I data. Paper, Centre for Earth Observation Science, Department of Geography, University of Manitoba.

**ABSTRACT/DESCRIPTION:**

Snow is a significant and vital component of the hydrological cycle in the temperature regions of the Northern Hemisphere and therefore must be examined in any detailed study of climate change of hydrosphere-biosphere interactions. The water equivalent of snow on the ground, or snow water equivalent (SWE), is the depth of water resulting from a melt of a column of snow cover and is important for understanding spring moisture recharge contributions for crop growth and river stage forecasting. Because of the widespread extent of snow cover in the Northern Hemisphere, satellite borne passive microwave remote sensing systems offer the optimal spatial and temporal coverage necessary for operational snow water equivalence mapping. Work by previous researchers (Stiles and Ulab, 1980; Tiuri and Sihvola, 1982; Swift et al. 1985) has consistently linked imprecisions in snow water equivalence (SWE) mapping to spatial and temporal heterogeneities in the complex dielectric constant and volume emissivity of snow covered surfaces. In this work we propose to: 1) provide a theoretical review of the linkages between snow geophysics, electrical properties and the emissivity of a naturally occurring snow cover; and 2) to evaluate these models within the context of SWE mapping using passive microwave remote sensing over a site where detailed snow course information is maintained throughout an annual cycle.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** N.W.T.

## MEMORIAL UNIVERSITY

**96-053 FARID, E. (1996).** Survey and excavation of Inukjuak and Kangiqsujuaq (Northern Quebec), by Avataq Cultural Institute. NSTP Research Report, Department of Archaeology, Memorial University.

**ABSTRACT/DESCRIPTION:**

The first half of the project was spent in Inukjuak, from July 16 to August 14, 1996. The project included excavation of the Middle/Late Dorset site, IcGm5a; and survey of three of the Hopewell Islands for indication of the Thule and Dorset occupation. Survey and excavation was lead by Avataq Cultural Institute's archaeological team. The second half of the project was located in the area of Kangiqsujuaq (Wakeham Bay) from August 18 to August 28. The focus of the project was twofold, first the study of Dorset Petroglyphs on Quyatalik Island and second the survey of this and surrounding islands for Dorset and Thule occupation.

**DISCIPLINE:** Archaeology.

**FIELDWORK LOCATION:** Inukjuak and Kangiqsujuaq, Northern Québec.

**96-054 PIERCEY, S.J. and WILTON, D.H.C. (1996).** The geology and geochemistry of granitoids from the Umiakoviarusek Lake Region, Labrador: Preliminary results. Poster, Newfoundland Department of Mines and Energy, Canadian Institute of Mining, Metallurgy, and Petroleum Open House, St. John's, Newfoundland, November 1996.

**ABSTRACT/DESCRIPTION:**

Granitoids from the Umiakoviarusek Lake area of Labrador represent anorogenic magmatism associated with the Mid-Proterozoic emplacement of the Nain Plutonic Suite (NPS). Although previously mapped by Emslie and Russell (1988), minimal geochemical and petrographic work has been carried out on those granitoids both south and east of Umiakoviarusek Lake. The impetus of this study arises from this and is as follows: 1) to derive geochemical and petrographic data from these granitoids and 2) to compare our data to other NPS granitoids and to ascertain correlations can be made (cf. Emslie and Stirling, 1993). The implications of this study are as follows: 1) fractionation of granitoids in the NPS is not only represented geographically north to south, but also west to east; 2) the granitoids of the Umiakoviarusek Lake region have similar K/Ti and Ba/Ti behaviour to regional trends but are chemically distinct with different REE behaviour and increased fractionation; 3) the increase in hydrous minerals (biotite, nornblende, apaptite) and lack thereof in the east (dominance of OPX) suggest that granitoids east of Umiakoviarusek Lake represent the deeper crustal (and less hydrous) level granitoids; however, they are equivalent to the Phase

2 intrusives south of Umiakoviarusek Lake.

**DISCIPLINE:** Geology.

**FIELDWORK LOCATION:** Umiakoviarusek Lake, Labrador.

## UNIVERSITÉ DE MONTRÉAL

**96-055 GRAY, J., DECKER, V., GUINDON, L., GUÉNETTE, C. and CLARK, C. (1996).**  
Late glacial ice flow patterns in the Northwest Torngat Mountains: Evidence for an important local dispersal centre. Paper, Geography Department, Université de Montréal.

**ABSTRACT/DESCRIPTION:**

To date, most field evidence for ice flow patterns in the Torngat Mountains has concentrated on the eastern or Labrador flank of the mountain range. It has become apparent that the western flank of the Torngat Mountains is a critical area for evaluating existing hypotheses on ice flow patterns in the eastern Hudson Strait and Ungava Bay sector. Suitable helicopter logistics, provided by Coastguard Canada in 1992, 1994 and 1995, enabled erosional and depositional evidence to be examined for 24 sites between Ungava Bay coast and the crest of the Torngat divide. The area covered extends from the Button Islands in the north to the Keglo bay area 200 km to the south.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Torngat Mountains, Labrador.



## UNIVERSITÉ DU QUÉBEC À CHICOUTIMI

**96-056 CORCORAN, P.L. (1996).** Implications of an archean strike-slip basin: the clastic Beaulieu Rapids Formation, Northwest Territories, Canada. Rapport, Maîtrise, Département des sciences de la terre, Université du Québec à Chicoutimi.

### **RÉSUMÉ/DESCRIPTION:**

La formation de Beaulieu Rapids est une séquence sédimentaire de 0,2 à 1 km d'épaisseur située au centre-sud de la Province structurale de l'Esclave. La formation représente un bassin en décrochement archéen qui s'est développé le long d'une faille majeure de direction nord-sud. Des petits plutons de porphyres quartzo-feldspathiques à hornblende sont localisés le long de la zone de faille. Des datations U-Pb sur zircons donnent un âge approximatif de 2.6 Ga pour ces plutons. La présence de fragments de porphyres dans les conglomérats indique que la formation de Beaulieu Rapids doit conséquemment être plus jeune que cet âge. La marge ouest du bassin est caractérisée par une discordance que sépare la ceinture volcanique de Rivière Beaulieu de la succession sédimentaire. Des failles NE tardives sont présentes sur les bordures nord et sud du bassin.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Formation Beaulieu Rapids, T.N.-O.

**96-057 KAINE, É. (1996).** Creating things which retain the memories. Research Report, Département des arts et lettres, Université du Québec à Chicoutimi.

### **ABSTRACT/DESCRIPTION:**

The research project *Design et culture matérielle* (Design and Material Culture) identifies the artifact as the meeting place between two design cultures- those of Native peoples (Amerindian and Inuit) and those of contemporary practices; between two paradigms- that of traditional societies and that of modern societies; between two disciplinary fields- anthropology and object design; and between two methods of accessing knowledge- acquisition by description/explanation and acquisition by interpretation/creation. The goal of the present paper is to present the concept having led to the creation of a computerized data bank, itself at the base of an interactive tool for analysis and creation. The interface configuration of this tool calls on two distinct modes of knowledge for grasping the technical object, in this way allowing the user to choose by which specific angle he/she wishes to approach the object: either by the aesthetic mode which, by way of an ambient iconography and literary texts, express the content and the experiences generated by the object; or by the analytic mode which, by way of data bank offering two hundred items of information, describes the object in a very complete manner. Thus, we hope to contribute to the diffusion of the material culture of Native societies, especially to contemporary creators.

**DISCIPLINE:** Anthropology.

**FIELDWORK LOCATION:** Inukjuak, Northern Québec.

**96-058 KAINE, É. (1996).** Les objets de la classe de Raymonde. Compte-rendu de l'exposition des travaux de design d'objets, élèves de cinquième française, école Innalik, Inukjuaq, Octobre 1996.

**RÉSUMÉ/DESCRIPTION:**

Le projet de recherche Design et culture matérielle vise, entre autres objectifs, la valorisation et la promotion de la culture matérielle (objets de design fonctionnels), des peuples inuit, et ce autant auprès des communautés inuit que non inuit. Il est en effet de toute première importance de souligner ici qu'il s'agit en fait d'une volonté d'échanges mutuels entre cultures en regard à des savoirs en design, puisqu'un autre volet de notre projet tente l'application de la même méthode pédagogique auprès de jeunes designers en formation, qui selon nous ont tout intérêt à apprendre par le biais des riches pratiques de design des peuples inuit.

**DISCIPLINE:** Éducation.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Inukjuak, Northern Québec.

**96-059 LAVOIE, D. (1996).** L'art de l'intérieur; du lieu à l'objet, de l'objet au lieu. Rapport d'étude, Maîtrise, Département des arts plastiques, Université du Québec à Chicoutimi.

**RÉSUMÉ/DESCRIPTION:**

Partant du concept originel de l'exploration scientifique du dix-huitième siècle, je témoigne de l'ailleurs. Observations scientifiques, notes personnelles et interprétations artistiques participent à la compréhension de cet ailleurs. L'expérience du voyage, marquée par la particularité de visiter des lieux géographiques aussi dissemblables que le Grand Nord québécois et l'Afrique australe de même que des lieux imaginaires et virtuels, s'inscrit dans la mémoire du corps matérialisée dans la création de meubles de rangement. Tel un récit, mon but est de raconter ma compréhension découlant de l'observation à travers des objets. Je propose ces oeuvres comme des pages d'un journal de voyage puisque c'est à partir d'elles et seulement par elles que se trouve une possible découverte, car il n'y a pas eu de pensée qui a émergé avant, préalablement, à décoder, à expliquer. Je n'emprunte pas un vocabulaire formel mais un lieu, un paysage, un souvenir. Aussi, à l'intérieur du parcours de l'exposition, ce que je propose au spectateur c'est de s'amuser à reconstituer l'histoire de l'expérience. Car, il est vrai que chaque objet émerge d'un récit premier, basé sur des faits véridiques ou fictifs. Mon but est de raconter à la manière du récit, ma compréhension découlant de l'observation et de l'expérimentation d'un ailleurs à travers la création d'objets d'usage



pratique. Cette recherche questionne me pratique artistique non pas en terme de beauté, de performance technique ou de perfection mais comme fragment de ma propre expérience intérieure, de ma manière de voir et de vivre mon espace dans la collectivité.

**DISCIPLINE:** Histoire.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Québec nordique.

**96-060 MUELLER, W. U. et CORCORAN, P.L. (1996).** Caractérisation de la formation de Raquette Lake, T.N.-O.: étude volcano-sédimentaire. Mémoire de fin d'études, Sciences de la terre, Université du Québec à Chicoutimi.

**RÉSUMÉ/DESCRIPTION:**

La Formation de Raquette Lake (2663+7/-SMA) est une séquence volcano-sédimentaire de 5 km de long et d'une épaisseur de 120 m. Elle comprend 5 associations de faciès sédimentaires basées sur trois colonnes stratigraphiques: 1-une association de faciès grès et conglomérat composé d'un grès conglomératique à fragments gneisso-plutoniques interprétée comme un dépôt de coulée de masse, d'un grès à cailloux gneisso-plutoniques interprété comme un dépôt d'une coulée en feuillet (sheetflow deposit), d'un conglomérat volcanique mafique à support de fragments interprété comme un dépôt de bancs de graviers. 2-Une association de faciès d'un grès à stratifications planaires avec des lamines d'argilite représentant une zone sous l'influence des vagues avec des périodes calmes (dépôt de suspension). 3-Une association de faciès shale et argilite; une argilite représentant un dépôt de suspension, un shale représentant également un dépôt de suspension. 4-Une association de faciès calcaireux; une roche carbonatée secondaire représentant une zone sous l'influence des vagues, un grès calcaireux représentant une zone proximale sous l'influence des vagues d'une zone de rivage. 5-Une association de faciès d'un grès riche en quartz représentant un dépôt de rivage. Deux unités de roches volcaniques sont reconnues: 1-une unité de roche volcanique felsique massive à bréchique représentant une coulée de lave felsique et 2-une unité de roche volcanique mafique; des dykes/filons-couches mafiques représentant des intrusions, une roche volcanique mafique représentant une coulée de lave mafique.

**DISCIPLINE:** Géographie physique.

**LIEU DU TRAVAIL SUR LE TERRAIN:** Raquette Lake, T.N.-O.

**96-061 MUELLER, W. U. and CORCORAN, P.L. (1996).** The enigmatic Keskarrah formation: a late-stage, basement-controlled sedimentary basin. Research Report, Sciences de la terre, Université du Québec à Chicoutimi.

**ABSTRACT/DESCRIPTION:**

The 2.6Ga Keskarrah Formation (lat. 65 08'-65 21', long. 112 45'- 113 10') is a coarse clastic sedimentary sequence that unconformably overlies the 2.69-2.7Ga mafic volcanic Peltier Formation and the 3.1 5Ga Augustus Granite. The formation, approximately 18 km long and 13 km wide, is adjacent to an important north-trending fault and is characterized by a series of north-trending synclines and anticlines. Local felsic/intermediate volcanic flows are in faulted contact with the sedimentary sequence whereas the contact with the siltstone/mudstone dominated Contwoyto Formation remains problematic. Three principal lithological units comprise the Keskarrah Formation: 1) a conglomerate unit, 2) a sandstone unit, and 3) a siltstone sandstone unit.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Keskarrah Formation, N.W.T.

**96-062 MUELLER, W. U. and CORCORAN, P.L. (1996).** The Peltier Formation, Cyclops Peninsula, Point Lake: geochemical signature and geodynamic implications. Research Report, Sciences de la terre, Université du Québec à Chicoutimi.

**ABSTRACT/DESCRIPTION:**

The Archean ca.2.69-2.7Ga Peltier Formation, located in the north-central part of the Slave Structural Province, is a prominent subaqueous mafic volcanic succession. The massive, pillowed and brecciated rocks unconformably overlie the 2.9Ga Augustus granite, and in turn have an erosional unconformable contact with the 2.6Ga clastic Keskarrah Formation. A detailed sampling program was implemented at Cyclops Peninsula, to establish the relationship between the clastic sedimentary rocks of the Keskarrah Formation and the volcanic sequence of the Peltier Formation. Regional mapping and detailed facies analyses revealed a complex folding pattern whereby the sedimentary rocks young away from the volcanic rocks that represent topographic as well as structural highs. The volcanic rocks have undergone greenschist to lower amphibolite grade metamorphism. Metamorphic amphibole and plagioclase overprinted relict igneous textures.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Peltier Formation, N.W.T.

## UNIVERSITÉ DU QUÉBEC À MONTRÉAL

**96-063 DUCHEMIN, E., LUCOTTE, M. and CANUEL, R. (1996).** Source of organic matter responsible for greenhouse gas emissions from hydroelectric complexes of the boreal region. Paper, Fourth International Symposium in the Geochemistry of Earth's Surface, July 22-28, 1996, Yorkshire, England.

**ABSTRACT/DESCRIPTION:**

The creation of extensive hydroelectric reservoirs in northern Québec may play an important role in the C cycle, not simply in inhibiting the natural sinks but, more importantly, in liberating greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) responsible for the degradation of organic matter stored in the boreal soils. These hypotheses are presently at the heart of current debates concerning methods of energy production. ÷ **Σ** The goal of the present investigation was to approximate the importance of soil-water emission fluxes and relate them to the sources of degrading organic matter producing CO<sub>2</sub> and CH<sub>4</sub>.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northern Québec.

**96-064 MONTGOMERY, S. (1996).** Structure of the lower food chain of a flooded system of northern Québec (Canada). Paper, Fourth International Symposium on the Geochemistry of the Earth's Surface, July 22-28, 1996, Yorkshire, England.

**ABSTRACT/DESCRIPTION:**

In order to evaluate the influence of flooding on C uptake and trophic interactions in the aquatic food chain, large-volume water samples collected from a flow-through system consisting of an upstream lake, a region flooded for three years, and a downstream lake were divided into three main particulate fractions: (1) 0.45 μm < X < 63 μm, (2) 63 μm < X < 210 μm, and (3) X > 210 μm, representing suspended particulate matter of predominantly terrestrial origin (C/N=14), phyto- and microzooplankton (C/N=10), and zooplankton (C/N=8), respectively. ÷ **Σ** Overall, our study shows that contrary to what would be anticipated of a classical food chain, rather than deriving their nutrition from phytoplankton, zooplankton in flooded environments seem to thrive on fine suspended matter, likely enriched with bacteria as evidenced by their very negative isotopic signature.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**96-065 MONTGOMERY, S., LUCOTTE, M. and RHEAULT, I. (1996).** Total mercury and methyl mercury accumulation in suspended particulate matter and plankton of a flooded system of northern Québec (Canada). Paper, Fourth International Conference on Mercury as a Global Pollutant, August 4-8, 1996, Hamburg, Germany.

**ABSTRACT/DESCRIPTION:**

During August 1995, large-volume water samples collected from several flooded sites and neighbouring natural lakes were divided into three main fractions: (1)  $0.45 \mu\text{m} < X < 63 \mu\text{m}$ , (2)  $63 \mu\text{m} < X < 210 \mu\text{m}$ , and (3)  $X > 210 \mu\text{m}$ , representing, for the most part, unidentified suspended particulate matter (SPM), phyto- and microzooplankton, and zooplankton, respectively. A concentrated sampling effort was made in an area known as LA-40; a flow through system consisting of an upstream lake, a region flooded since 1992, and a downstream lake.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Northern Québec.

**96-066 ROY, M., LAMOTHE, M. and NIELSEN, E. (1996).** Glacial and non glacial event-stratigraphy of the Nelson River area and implications for the Quaternary evolution of the Hudson Bay Lowlands of Manitoba. Paper, Géologie du Quaternaire, Université du Québec à Montréal.

**ABSTRACT/DESCRIPTION:**

Quaternary geology of the Hudson Bay Lowlands has long been of interest to geologists working on the glacial history of Canada. Recent works have questioned the rank, age, provenance and number of glacial and non glacial units present in this region. The sediment record of the Hudson Bay Lowlands of Manitoba shows a long and complex succession of Quaternary events. Detailed stratigraphic investigations of new sections carried out in the Nelson River area during the last summer revealed the presence of four till units and two non glacial units, the oldest one being recognized herein, for the first time. These units are believed to reflect the manifestation of multiple cycles of glaciation and deglaciation or changes in ice flow direction during the same glacial advance. Thermoluminescence dating has been applied to the youngest non glacial unit known as the Nelson River Sediments. The results obtained gave very young ages (ca. 35-45 Ka) that are difficult to fit into the global Quaternary record. In order to solve this problem, a new dating method, the Optical Luminescence, will be performed on both non glacial units.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Nelson River, Hudson Bay, Northern Manitoba.

## QUEEN'S UNIVERSITY

**96-067 HAY, M.B. (1996).** Diatom-based model for reconstruction of paleohydrology in the Mackenzie Delta, Northwest Territories, Canada. Thesis, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

Estimation of past discharge from major Arctic watersheds is critical for understanding long-term natural variability and response of large watersheds to climatic change. Coastal delta floodplain lakes are tightly coupled to the discharge variation of their associated river systems. Fossil diatom assemblages within the lake sediments should provide integrative records of these interactions. Surface sediments and environmental variables were collected from 77 lakes in the Mackenzie Delta, N.W.T. (Canada), representing lakes having continuous connection with the Mackenzie River (no-closure), lakes that flood each spring (low-closure), and lakes that flood only every few years (high-closure). §

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Mackenzie Delta, N.W.T.

**96-068 LAING, T.E. and SMOL, J.P. (1996).** Diatom-based paleolimnological studies from treeline regions in northern Siberia. Paper, 14th International Diatom Symposium, September 2-8, 1996, Tokyo, Japan.

**ABSTRACT/DESCRIPTION:**

Knowledge of the past response of treeline ecosystems to climatic change is important, as global warming is predicted to have enhanced effects on these systems. Diatom assemblages are commonly used as environmental indicators in paleolimnological studies as they respond to climatic change both directly in response to temperature changes, and indirectly in response to vegetation-linked factors, such as dissolved organic carbon (DOC). In our study, we used canonical correspondence analysis (CCA) to relate surficial sediment diatom assemblages in 31 lakes in the Lena River region, northeastern Siberia to measured environmental variables. Our analysis indicated that DOC was an important factor influencing diatom distributions across treeline, suggesting that diatom assemblages in this region were sensitive to changes in catchment vegetation. We then examined changes in diatom assemblages preserved in a sediment core collected from a tundra lake near the Lena River Delta. Evidence from pollen and stomate analyses indicates that trees were present in the area between approximately 8000 and 4000 years BP. Diatom assemblages shifted to a more productive assemblage characterized by *Achnanthes* species coincident with the movement of trees into the region. Here, we present some possible paleoclimatic scenarios based on changes in diatom assemblages in the core, and compare these scenarios to those developed from a core taken near Norilsk, northcentral Siberia.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Norilsk, Northern Siberia.

**96-069 LEFEVRE, K.L. (1996).** Parent-Offspring Communication in a Thick-billed Murre Colony: Vocal Repertoire, Variation and Individual Recognition. Thesis, Department of Biology, Queen's University.

**ABSTRACT/DESCRIPTION:**

Recognition between parents and their offspring is expected to be well-developed in bird colonies since there is a high risk of chicks intermingling in these situations. I investigated parent-offspring recognition in thick-billed murres (*Uria lomvia*), at Coats Island, Northwest Territories. My first objective was to detail this species' call repertoire and structure since vocalizations are typically the basis for individual recognition in birds. To determine which calls are used in parent-offspring communication, I observed adult murres in a breeding colony and recorded their calls. From spectrograms and by ear, I described four chick calls and six adult calls in the thick-billed murre vocal repertoire. ÷ ~~3~~ Collectively these experiments show that, like many other highly colonial birds, thick-billed murres employ mutual parent-offspring recognition. My results concur with pioneering studies of recognition in the closely related common murre.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Coats Island, N.W.T.

UNIVERSITY OF SASKATCHEWAN

**96-070 ATKINSON, S.N., CATTET, M.R.L, POLISCHUK, S.C. and RAMSAY, M.A. (1996).**

A case of offspring adoption in free-ranging polar bears (*Ursus maritimus*). Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

During a study of the reproductive ecology of polar bears (*Ursus maritimus*) in western Hudson Bay (Canada), we documented a case of litter adoption. In an eight-month period, a ten-year-old adult female lost a litter of two cubs-of-the-year and adopted three other cubs-of-the-year. This is the first reported case of natural offspring adoption in polar bears, and its significance as a reproductive strategy is unknown. Nevertheless, the observation raises questions regarding the social circumstances under which adoption may occur and the benefits or costs to maternal fitness in a solitary mammal such as the polar bear.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Hudson Bay, Canada.

**96-071 BASINGER, J.F., KOTYK, M.E. and GENSEL, P.G. (1996).**

Early land plants from the Late Silurian-Early Devonian of Bathurst Island, Canadian Arctic Archipelago. Paper, Department of Geological Sciences, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Silurian/Devonian (Ludlow to Pragian) rocks of Bathurst Island, Canadian Arctic Archipelago, have yielded an abundance of well preserved fossil plants, including some of the earliest known land plants. Pre-Emsian plants are rare globally, yet represent the critical early stages in the evolution of vascular land plants. The Bathurst Island fossils now represent the most diverse pre-Emsian flora known from North America. Of additional significance is the discovery of basal parts of plants with attached rooting structures, organs generally unknown for early land plants.

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Bathurst Island, N.W.T.

**96-072 BORTOLOTTI, G.R. and DAWSON, R.D. (1996).**

Is colour a sexually selected trait in American kestrels? Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

American kestrels (*Falco sparverius*) have brightly coloured areas of skin devoid of feathers—the cere, lores and tarsi. The colour of these areas varies from a dull yellow to a bright red-orange, and is known to be the product of carotenoid pigments. We suggest that such colouration may be the product of sexual selection. Traits that have been sexually selected are typically sexually dimorphic, develop at sexual maturity, and are displayed during the breeding season. We present evidence for such patterns for colour variation in wild kestrels in Saskatchewan and captive kestrels at the Avian Science and Conservation Centre of McGill University. In addition, we show that wild kestrels are paired assortively with respect to colour, and that carotenoids may be a condition-dependent trait that may be used in mate choice.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**96-073 CATTET, M.R.L., LEIGHTON, R.A., NELSON, R.A., RAMSAY, M.A. and VIJAYAN, M.M. (1996).** “Energy metabolism in a starving mammal, the polar bear (*Ursus maritimus*)”. FASEB Journal, 10(3):A212.

**ABSTRACT/DESCRIPTION:**

Starvation is an integral feature in the life history of the polar bear and annual fasts of 4-8 months are typical. To understand energy metabolism in these mammals we are using stable isotope methodology to compare and contrast energy substrate interactions during feeding and prolonged fasting and to assess the role of lipid and protein catabolism in the synthesis of substrates for gluconeogenesis. Our preliminary data indicate fasting polar bears differ significantly from other fasting mammals in their metabolic features. These data include: a) fasting polar bears (n=177) do not accumulate ketones in their blood; b) fasting polar bears (n=81) maintain respiratory quotients less than 0.7; c) 3-hydroxyacyl-CoA dehydrogenase activity remains low ( $x=1545 \mu\text{mol}/\text{min}/\text{mg}$  liver protein; n=7) during fasting; d) glycogen accumulated in the livers of fasting polar bears ( $x=145 \mu\text{mol}/\text{g}$  liver; n=4); e) serum glucose levels increase in fasting polar bears; f) glycolysis increases in the livers of fasting polar bears; and g) alanine amino transferase activity is low ( $x=294 \mu\text{mol}/\text{min}/\text{mg}$  liver protein; n=7) during fasting. From these data, we hypothesize polar bears utilize fatty acids as gluconeogenic precursors, with the net effect of conserving body proteins and avoiding ketosis.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Churchill, Northern Manitoba.



**96-074 DAWSON, R.D. and BORTOLOTTI, G.R. (1996).** Colour and blood parasites of American kestrels: a test of the Hamilton-Zuk Hypothesis. Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Although many authors have suggested that animal colouration, particularly sexual dichromatism, may have evolved through sexual selection, mechanisms have always been problematic. W.D. Hamilton and M. Zuk (1982) stimulated considerable controversy when they proposed that bright colours may be indicative of a bird's genetic resistance to parasites. We test the Hamilton-Zuk hypothesis that brightness and parasite load are inversely correlated in a wild population of American kestrels (*Falco sparverius*). In 1994 and 1995 we scored the colour of the cere, lores and tarsi of kestrels captured during pre-laying (N=64 males and 101 females) and incubation (N=124 males and 167 females). Colour varied from a dull yellow to a bright red-orange. We took a blood smear from each bird, and G.F. Bennett quantified the haematozoans. Ninety percent of the birds were infected and seven species of parasites were detected; however, most birds were infected with two species of *Haemoproteus*. Considering, *Haemoproteus* alone or all species combined, we could not find support for the Hamilton-Zuk hypothesis. Colour was unrelated to the intensity of the infection, and birds that were unparasitized were no more colourful than those that were parasitized.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**96-075 DAWSON, R.D. and BORTOLOTTI, G.R. (1996).** Avian haematocrits and total plasma proteins as indicators of condition in breeding American kestrels. Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Diseased animals or those in poor condition are known to have haematocrits (HC) and total plasma protein levels (TP) that deviate from normal values. We therefore examined the utility of these parameters as indicators of health and condition in wild American kestrels (*Falco sparverius*). HC and Tp did not vary with breeding chronology, habitats quality, age, or molt, but increased with ambient temperature. HC did not differ between the sexes, or between the pre-laying and incubation periods. HC did not vary with condition, although HC increased with the level of infection of the blood parasite *Haemoproteus*. TP was significantly higher in females than males, and higher during the pre-laying than incubation. For both sexes, TP did not vary significantly with time of sampling, or blood parasite load. Female TP increased with date of sampling and condition during pre-laying, while the same pattern was seen in males during incubation. Our results suggest that at least some variation observed in Tp levels is attributable to physical condition. The usefulness of HC as indicators of condition

is questionable, and given the association with parasites, may even lead to erroneous conclusions.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**96-076 GERRARD, J.M., BORTOLOTTI, G.R. and WIEBE, K.L. (1996).** Birds of the Besnard Lake Area. Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

This book is a compilation of information on the birds of the Besnard Lake area obtained from our extensive fieldwork between 1968 and 1994. We report on 209 species in that region and comment on others in adjacent areas. For the most part it is a comprehensive summary of all we know of those species. We compare our findings to what little other information is available for nearby areas, but the natural heritage of northern Saskatchewan remains largely undocumented.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**96-077 WIEBE, K.L. and BORTOLOTTI, G.R. (1996).** The proximate effects of food supply on intra clutch egg-size variation in American kestrels. Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Egg size can be an important determinant of offspring survival in birds. We measured eggs from 275 clutches of wild American kestrels (*Falco sparverus*) to study the degree of intra clutch variability in egg size. We also performed two food-supplementation experiments to investigate the proximate role of food supply during laying in determining egg size. Females with relatively abundant food and those in good body condition did not lay eggs that were more uniform in size than those laid by control females. This result is contrary to hypotheses that propose an adaptive explanation for intra clutch egg-size variation and also to ideas of energy depletion during laying. Patterns of egg size versus laying in order were different between years, suggesting that females did not adaptively manipulate laying order and egg size within a clutch. The food-supplementation experiments showed that laying female kestrels probably depend on both stored energy reserves and on a daily energy surplus from eggs. It appears that slight intra clutch variations in egg size occur in response to short-term food shortages during laying, but that these variations are probably nonadaptive. This is in marked contrast to inter clutch (among females) variation in egg size, which we have shown varies significantly with food supply.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.

**96-078 WIEBE, K.L. (1996).** The insurance-egg hypothesis and extra reproductive value of last-laid eggs in clutches of American Kestrels. Paper, Department of Biology, University of Saskatchewan.

**ABSTRACT/DESCRIPTION:**

Many species of birds lay more than they normally rear to independence. This is illustrated well by species with obligate siblicide, such as eagles and boobies, where the youngest nestling in a brood is killed by its older sibling in a physical struggle soon after hatching. A common explanation for such behaviour is that parents can raise only one offspring, but lay the extra egg for insurance against infertility; the surplus offspring is eliminated if its older sibling is viable. Field experiments testing the insurance-egg hypothesis have been performed for a few species with obligate siblicide.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Besnard Lake, Northern Saskatchewan.



## SIMON FRASER UNIVERSITY

**96-079 SANDERCOCK, B.K. (1996).** Egg-capping and eggshell removal by western and semipalmated sandpipers. Paper, Department of Biological Sciences, Simon Fraser University.

### **ABSTRACT/DESCRIPTION:**

Parents of birds with nidicolous young that remain in the nest after hatching generally remove eggshells from the nest after the chicks emerge from the eggs. In contrast, birds with nidifugous young usually leave eggshells and unhatched eggs in the nest when the brood departs on the day of hatching. Shorebirds (*Suborder Charadrii*) are a curious exception to this pattern. Despite having well-developed precocial young that leave the nest soon after hatching, many shorebirds will remove the shells of hatched eggs from the nest (e.g., Red Knot (*Calidris canutus*), Whitefield and Brade 1991; White-rumped Sandpiper (*C. fuscicollis*), Parmelee 1992; Buff-breasted Sandpiper (*Tryngites subruficollis*), Lanctot and Laredo 1994; Black-necked Stilt (*Himantopus mexicanus*), American Avocet (*Recurvirostra americana*), Sordahl 1994). Tinbergen et al. (1962) suggested five reasons that parents might remove eggshells: (1) if sharp shell edges injure chicks, (2) if shells from hatched eggs interfere with brooding, (3) if material on remaining shells increases the risk of bacterial infection, (4) if the white linings of eggshells from hatched eggs increase the conspicuousness of the nest to a predator (here called the predation hypothesis), or (5) if the shells from a hatched egg become affixed to a later-hatching egg, forming a double shell layer that a pipping chick cannot break through (here called the egg-capping hypothesis, Derrickson and Warkentin 1991, Arnold 1992). The first three explanations seem unlikely for shorebirds because the young do not remain long in the nest. In this note, I evaluate the predation and egg-capping hypotheses as explanations for parental removal of eggshells at hatching by Western Sandpipers (*Calidris mauri*) and Semipalmated Sandpipers (*C. pusilla*).

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Nome, Alaska.

**96-080 SANDERCOCK, B.K. (1996).** Migration routes of the Western Sandpiper. Paper, Department of Biological Sciences, Simon Fraser University.

### **ABSTRACT/DESCRIPTION:**

We report the locations of 97 sightings of over 15,000 Western Sandpipers (*Calidris mauri*) colour banded in Peru, Panama, Mexico, British Columbia and Alaska. Ninety-five sightings were made in states and provinces along the Pacific Coast of Central America and North America. One sandpiper banded in British Columbia and one from Peru were seen east of the Rocky Mountains. We propose that most Western Sandpipers migrate from Central and

South American winter quarters along the Pacific coast of North America. We also propose that most post-breeding Western Sandpipers use a trans-Pacific route that bypasses southeast Alaska and makes landfall in southern British Columbia. Western Sandpipers that spend the winter on the Atlantic coast of the USA and in the Caribbean fly a trans-continental route beginning from the Pacific coast of North America.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Nome, Alaska.

**96-081 SQUIRES, M.M. and LESACK, L.F.W. (1996).** Metabolism of benthic algae on artificial substrates suspended in limnocorrals receiving pulses of sediments and nutrients, South Lake, Mackenzie Delta, Northwest Territories. Paper, Department of Geography, Simon Fraser University.

**ABSTRACT/DESCRIPTION:**

The Mackenzie Delta is a lake-rich environment where the distribution and abundance of phytoplankton, macrophytes, and benthic algae among the lakes may be controlled by an interaction between nutrient supply in the water column and sediments, and episodic reductions in light availability associated with river flooding. To simulate the effects of episodic river inflow on benthic algae, limnocorrals (Z=3m) were dosed infrequently ( $1 \times \text{wk}^{-1}$ ) or frequently ( $3 \times \text{wk}^{-1}$ ) with high or low levels of sediment and nutrients (N and plebiscite) in a balanced triplicate design (15 enclosures) and artificial substrates, enriched to mimic the supply of nutrients at the sediment/water interface, were suspended in the limnocorrals at 2m depth for 6 weeks in July and August, 1995. Increases in biomass of benthic algae over time were oscillatory for all treatments in contrast to the control, where biomass increased linearly. Instantaneous rate of growth was highest for the control and lowest for enclosures receiving high and frequent pulses of sediments and nutrients. Community metabolism for high-infrequent and high-frequent treatments were net heterotopic. Overall, gross photosynthesis was highest for the low-frequent treatment, followed by the control, and low-infrequent treatment. These results suggest the abundance of benthic algae in Mackenzie Delta lakes may peak at intermediate transparencies in contrast to phytoplankton and macrophytes.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** South Lake, Mackenzie Delta, N.W.T.

## UNIVERSITY OF TORONTO

**96-082 KARELS, T.J. (1996).** Interactions between food and predation in limiting Arctic ground squirrel populations. M.A. Thesis, Department of Zoology, University of Toronto.

### **ABSTRACT/DESCRIPTION:**

I examined the importance of food and predators in limiting populations of Arctic ground squirrels (*Spermophilus parryii plesius*) in the southwestern Yukon during the low phase of the snowshoe hare (*Lepus americanus*) cycle from spring 1993 to spring 1995. Live trapping was conducted on four control grids and four experimental treatments (one mammalian predator enclosure grid), two food addition grids, and one mammalian predator enclosure + food addition grid. Squirrels were radio-collared on all treatments to monitor survival both during the active season and overwinter. Reduction of predators doubled population density, increased the percentage of breeding females, produced an increase in the percentage of females producing litters to juvenile emergence, and produced a higher estimated reproductive rate in both years. Food addition maintained higher densities (4-fold), increased the active season survival, improved body condition increased the proportion of females successfully raising litters, advanced juvenile emergence, and increased juvenile growth rate. Predator enclosure + food maintained higher densities (8-fold) and had slightly greater effects than were listed for the food addition treatment. Overwinter survival was not affected by any treatment. Both overwinter survival and active survival were higher during my study than were previously recorded for Arctic ground squirrels in the boreal forest during the early decline of the hare cycle. I conclude that predation independently has little importance on ground squirrel survival but that it interacts with food abundance to limit ground squirrel populations during the low phase of the snowhare cycle.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Kluane Lake, Yukon.

**96-083 SPENCE, C. (1996).** Aishihik Wolf fertility control study. M.A. Thesis, Department of Zoology, University of Toronto.

### **ABSTRACT/DESCRIPTION:**

The objective of this study is to assess whether fertility control can be used as a humane, cost-effective tool to help manage the wolf population in the Aishihik area in the long-term. The design is to surgically sterilize both the male and female of the dominant pair in each wolf pack. Both sexes are treated to ensure that any attempts to reproduce, by either of the wolves in the pair are unsuccessful. Males are vasectomized in a simple on-site procedure and females are tubally ligated in a mobile surgical unit, by a qualified veterinary surgeon. Surgical sterilization has been chosen as the method of reproductive control because hormones and

associated behaviours should not be affected by the procedures.

**DISCIPLINE:** Zoology.

**FIELDWORK LOCATION:** Aishihik, Yukon.

**96-084 SVOBODA, M.Y. (1996).** Establishment and monitoring of an ITEX site at Daring Lake,  
N.W.T. Paper, Department of Botany, University of Toronto.

**ABSTRACT/DESCRIPTION:**

In mid-May 1996 a long-term ITEX site was established at Daring Lake and was operated from the nearby Government of N.W.T. research base. A snow-depth transect and seven plant community plots were staked out down a 700 m long slope from the esker to the lake, each containing a population of selected vascular plants species. In these plots, a progression of phenological events on twenty or more plant individuals was followed and recorded on a daily basis. The following species were monitored: *Oxytropis nigrescens*, *Vaccinium vitis-idaea*, *Ledum decumbens*, *Betula glandulosa*, *Salix sp.*, *Saxifraga tricuspidata*, *Carex aqatilis* and *Eriophorum vaginatum*. The monitoring was terminated on June 28, when most of the species reached flowering stage but before ripening the seeds. In addition, the spring ice-break-up on Daring Lake was followed, and snow depth and snow disappearance along the established transect was monitored. An automatic micrometeorological station was set up in the middle of the slope.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Daring Lake, N.W.T.



## TRENT UNIVERSITY

**96-085 PERIN, S.L. (1996).** Short-term influences of ambient UV-B radiation on phytoplankton productivity and chlorophyll fluorescence in two lakes of the high Arctic. Thesis, Faculty of Arts and Science, Trent University.

### **ABSTRACT/DESCRIPTION:**

Decreases in stratospheric ozone has resulted in increased UV-B (280-320 nm) radiation at the earth's surface. During the summer of 1993, short-term experiments were conducted in two lakes of the High Arctic (Mould Bay, Prince Patrick Island) to assess the effects of ambient UV-B exposure on phytoplankton primary production and its size distribution and on both *in vivo* and DCMU-enhanced fluorescence of planktonic algae. Even though productivity rates were low in both lakes, inhibition of photosynthesis occurred when phytoplankton populations were incubated near the surface or on shore. Photo inhibition was not accompanied, in general, by any changes in the relative contribution of the pico-(0.2-2 $\mu$ m), nano-(2-20 $\mu$ m) and netplankton (>20  $\mu$ m) to productivity, suggesting that all size classes are affected. However, cells of size 0.2-1 $\mu$ m showed, in some instances, to be more UV-B tolerant than all other size classes. Strong depression of both *in vivo* and DCMU-enhanced fluorescence occurred on bright sunny days when algal cells were incubated at the surface or on shore, or when cells were freely circulating within the lake. Bright light was the principal component responsible for Photoinhibition and ambient UV-B intensified the photo inhibitory effect. Photoinhibition of phytoplankton population of both lakes depended both on the duration of exposure to visible light and UV radiation and on the irradiance levels received during that period. Phytoplankton responses were highly variable because, in nature, irradiance levels and time of exposure are dependent on many factors such as the attenuation of visible light and UV radiation in the water column, water mixing, wind speed, and the influence of air and water temperature on stratification. In addition cloud cover, rain, fog and snow can change the amount of visible light and UV radiation on a daily basis.

**DISCIPLINE:** Biology.

**FIELDWORK LOCATION:** Resolute Bay, N.W.T.



## UNIVERSITY OF VICTORIA

**96-086 MOLGAARD, P. and MOREWOOD, D. (1996).** ITEX insect: *Gynaephora groenlandica*/*G. rossii*. International Tundra Experiment, ITEX Manual - Second Edition, Danish Polar Centre, June 1996.

### **ABSTRACT/DESCRIPTION:**

Woolly-bear caterpillars, *Gynaephora groenlandica*, are important predators on the leaf bud and young catkins of *Salix* spp. early in the season. Field observations have shown a strong preference for *Salix arctica*, and for the reproductive success as well as for vegetative growth of the willows, the number and activity of the caterpillars may be of great importance. When present in the ITEX plots, especially those with *Salix* spp., notes should be taken on the *Salix* sheets or on the sheets especially designed for *Gynaephora* observations. Based on the potential impact the caterpillars may have on the plants in combination with the extraordinary life history of *Gynaephora* we consider it valuable for the ITEX activities and recommend that the woolly bear caterpillar is included as the first 'ITEX insect'. Detailed observations over the range of ITEX sites may throw light on the feeding habit, the impact on the plants, the influence on the *Salix* male/female ratio, the insect life cycle and periodicity of 'outbreaks', and the background for the preferred orientation.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.

**96-087 MOREWOOD, W.D. (1996).** Arctic and alpine woolly-bears: potential ITEX species? Paper, 7th ITEX Workshop, April 26-29, 1996, Copenhagen, Denmark.

### **ABSTRACT/DESCRIPTION:**

Insects have been suggested as potentially valuable indicators of environmental change, particularly climatic change in the Arctic. Because of their relatively short life cycles, high reproductive potential, and dispersal capabilities, insects should be among the first organisms to show noticeable responses to environmental changes. Furthermore, because they are ectothermic and of small size, development and activity of insects are strongly dependent on environmental temperatures. Many species have circumpolar and/or Arctic-alpine distributions, allowing for comparative studies like those conducted on ITEX plant species. In the long-term, relatively simple trapping programs could be used to detect changes in population levels, community composition, and geographic distributions of insects. More intensive studies of development and activity for individual species may be conducted using the standard ITEX open-top chambers. §

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.

**96-088 MOREWOOD, W.D. (1996).** Revision of the life history of *Gynaephora groenlandica* (*Lepidoptera: Lymantriidae*). Paper, Entomological Society of Canada/Acadian Entomological Society, Joint Annual meeting, October 5-9, 1996, Fredericton, New Brunswick.

**ABSTRACT/DESCRIPTION:**

Recently collected life history data for *Gynaephora groenlandica* indicate that larvae of this species typically develop through seven larval instars and that newly-hatched larvae normally overwinter before moulting to the second instar. Observations of moulting frequency suggest that the life cycle is considerably shorter than previously estimated.

**DISCIPLINE:** Environmental Sciences/Ecology.

**FIELDWORK LOCATION:** Alexandra Fiord, Ellesmere Island, N.W.T.

**96-089 PYLE, L.J. and BARNES, C.R. (1996).** The early post-rift nature of the northern Laurentian margin: preliminary lithostratigraphic and conodont biostratigraphic data from the Kechika Trough and Cassiar Terrane. Paper, SNORCLE and Cordilleran Tectonics Workshop, University of Calgary, Alberta, March 1-3, 1996.

**ABSTRACT/DESCRIPTION:**

Stratigraphic and conodont biostratigraphic and paleoecological studies have recently been initiated in northern British Columbia to understand the nature of the early post-rift phase of northern margin of Laurentian. This study complements work in progress for the southern Cordilleran and earlier work on the southern Laurentian margin in the Newfoundland Appalachians. The line of transect for the sections studied approximates to part of Line 2 of the SNORCLE/LITHOPROBE Transect. The two principle stratigraphic units examined are the Kechika Group (Upper Cambrian-Lower Ordovician) and the Road River Group (Lower Ordovician to Lower Devonian).

**DISCIPLINE:** Physical Geography.

**FIELDWORK LOCATION:** Northern British Columbia.

## **INDEX**



## **Author Index**





ALLAIRE, N., PIENITZ, R. and CAMBURN, K. ....	95-016
ALLARD, M., CARON, S. and BÉGIN, Y. ....	95-017
.....	96-029
ANDERSON, A.K. ....	95-001
ARII, K. ....	96-025
ARSENEAULT, D. et PAYETTE, S. ....	95-018
.....	95-019
ATKINSON, S.N., CATTET, M.R.L, POLISCHUK, S.C. and RAMSAY, M.A. ....	96-070
BASINGER, J.F., KOTYK, M.E. and GENSEL, P.G. ....	96-071
BEAULIEU, J., GAUTHIER, G. and ROCHEFORT, L. ....	95-020
.....	96-031
BERGERON, M. et WARWICK, F.V. ....	95-021
.....	95-022
BOIVIN, S. ....	96-033
BOIVIN, S. et BÉGIN, Y. ....	95-023
BORTOLOTTI, G.R. and WIEBE, K.L. ....	95-098
BORTOLOTTI, G.R., WIEBE, K.L. and GERRARD, J.M. ....	95-099
BORTOLOTTI, G.R. and DAWSON, R.D. ....	96-072
BRUNGS-SIMARD, A. ....	96-001
CAMPEAU, S., HÉQUETTE, A. et PIENITZ, R. ....	95-025
CAMPEAU, S. and HÉQUETTE, A. ....	95-024
CARON, S. ....	95-026
CARRIÈRE, S., GAUTHIER, G. et BROMLEY, R. ....	95-027
CARRIÈRE, S. ....	95-075
CATTET, M.R.L., LEIGHTON, R.A., NELSON, R.A., RAMSAY, M.A. and VIJAYAN, M.M. ....	96-073
CAUSLEY, T. ....	95-106
CHIPENIUK, R. ....	95-115
CHOINIÈRE, L. and GAUTHIER, G. ....	95-028
CLARK, D. ....	96-002

CLOUTIER, D. et HÉQUETTE, A. ....	95-030
.....	95-031
CLOUTIER, J. et FILION, L. ....	95-029
CORCORAN, P.L., MUELLER, W.U., CHOWN, E.H., ROY, D.W. and PADGHAM, W.A. ....	95-080
CORCORAN, P.L. and MUELLER, W.U. ....	95-077
.....	95-078
.....	95-079
CORCORAN, P.L. ....	96-056
CRÊTE, M. and MANSEAU, M. ....	96-035
DARWENT, C.M. ....	95-103
DARWENT, C.M. and LEMOINE, G. ....	95-104
DAWSON, R.D. and BORTOLOTTI, G.R. ....	96-074
.....	96-075
DESPLAND, E. ....	95-033
DESPLAND, E. et HOULE, G. ....	95-032
DLOTT, F. ....	96-026
DOUGLAS M.S.V., DOUBLEDAY, N.C. and SMOL, J.P. ....	95-085
DOUGLAS M.S.V., CUMMING, B.F., SMOL, J.P. and PIENITZ, R. ....	95-086
DOUGLAS M.S.V. and SMOL, J.P. ....	95-083
.....	95-084
DOUVILLE, C. ....	95-034
DROBOT, S., ONSTOTT, R. and GRENFELL, T. ....	95-068
DROBOT, S.D., BARBER, D.G. and YACKEL, J.J. ....	96-050
.....	96-051
.....	96-052
DUCHEMIN, E., LUCOTTE, M. and CANUEL, R. ....	96-063
DUFOUR, M. ....	96-036
DUFRESNE, F. and HEBERT, P.D.N. ....	95-015
EARNSHAW, C. ....	95-120
ENGLEFIELD, P.G.C. ....	95-002
FALLAS, K.M. ....	96-003

FARID, E. ....	96-053
FORTIER, M., FORTIER, L., LEBLANC, B. and LEGENDRE, L. ....	95-035
FORTIER, M., FORTIER, L. and DEMERS, S. ....	95-036
FORTIN, D., LAROCHELLE, J. et GAUTHIER, G. ....	95-037
FRANCIS, S.R. ....	95-003
.....	96-004
FURGAL, C., SHORTREED, J., KEITH, R., CRAIG, L. and DEWAILY, É. ....	95-116
GADALLAH, F.L. and JEFFERIES, R.L. ....	95-107
.....	95-108
GAGNE, M. et HOULE, G. ....	96-038
GAUTHIER, G. and HUGHES, R.J. ....	95-039
GAUTHIER, G., HUGHES, J.R., BEAULIEU, J., ROCHEFORT, L. and REED, A. ...	95-038
GAUTHIER, G. et PIEDBOEUF, N. ....	95-041
GAUTHIER, G., LEPAGE, D. and REED, A. ....	95-040
GERRARD, J.M., BORTOLOTTI, G.R. and WIEBE, K.L. ....	96-076
GRAY, J., DECKER, V., GUINDON, L., GUÉNETTE, C. and CLARK, C. ....	96-055
GREEN, R.G. ....	95-069
GRIFFITHS, C.T., ZELLERER, E., WOOD, D.S. and SAVILLE, G. ....	95-105
HARPER, K.A. and KERSHAW, G.P. ....	96-005
HARRINGTON, J.E.M. ....	95-087
HAY, M.B. ....	96-067
HAY, M.B. and SMOL, J.P. ....	95-088
HOLDER, K. ....	95-089
HORVATH, C.L., ROBINSON, S.D. and KETTLES, I.M. ....	95-004
HOWLAND, K.L., TALLMAN, R.F. and TONN, W.M. ....	95-005
.....	95-006
HOWLAND, K.L. ....	95-007
HUMPHRIES, M.M. and BOUTIN, S. ....	96-006
HUNT JONES, M. ....	95-008

IACOZZA, J. ....	95-070
JOINER, D.W., MCCAUGHEY, J.H. and LAFLEUR, P.M. ....	95-090
KAINE, É. ....	96-057
.....	96-058
KARELS, T. et al. ....	95-109
KARELS, T.J. ....	96-082
KASPER, J.N. ....	95-042
KIDD, K.A. ....	96-007
KIDD, K.A., SCHINDLER, D.W., HESSLEIN, R.H. and MUIR, D.C.G. ....	95-009
.....	95-010
KIDD, M.G. and FRIESEN, V.L. ....	95-091
KINNARD, N. ....	95-043
LABERGE, M.J. and PAYETTE, S. ....	95-044
LADANYI, B., FORTIER, R. et ALLARD, M. ....	95-045
LAFRANCE, B. and VARGA, M. ....	96-028
LAING, T.E. and SMOL, J.P. ....	95-092
.....	95-093
.....	96-068
LAMOUREUX, S. ....	96-008
LAURION, I., DEMERS, S. and VÉZINA, A.F. ....	95-067
LAURION, I., VINCENT, W.F. and LEAN, D.R.S. ....	95-046
LAVOIE, C. and PAYETTE, S. ....	95-047
.....	96-040
LAVOIE, D. ....	96-059
LEFEVRE, K.L. ....	95-094
.....	96-069
LEPAGE, B.A. and BASINGER, J.F. ....	95-100
LEPAGE, D., GAUTHIER, G. et DESROCHERS, A. ....	95-048
.....	96-042
LEPAGE, D., GAUTHIER, G. and REED, A. ....	96-041
LEPAGE, H. and BÉGIN, Y. ....	96-043

.....	95-049
LESAGE, L. and GAUTHIER, G. ....	95-050
LISTON, M.L. ....	95-011
.....	96-009
.....	96-010
LUNN, N.J., STIRLING, I. and NOWICKI, S.N. ....	96-011
MANSEAU, M. and HUOT, J. ....	95-051
.....	95-052
MANSEAU, M., HUOT, J. and CRÊTE, M. ....	96-045
MARION, C. ....	96-012
MARION, J., FILION, L. and HÉTU, B. ....	95-053
MARSHAL, J.P. ....	96-013
.....	96-014
.....	96-015
MARSHAL, J.P. and BOUTIN, S. ....	96-016
.....	96-017
MCCARDLE, G.J. ....	95-122
MCDONALD, I. ....	95-071
MCEWEN, A. ....	95-095
MCLEOD, K. ....	95-014
MÉNARD, E., ALLARD, M. et BÉGIN, Y. ....	96-046
MÉNARD, E., ALLARD, M. and MICHAUD, Y. ....	95-054
MENU, S., GAUTHIER, G. et REED, A. ....	95-055
MISURAK, K.M. ....	95-117
MISURAK, K.M., LEDREW, E.F., BARBER, D.G. and DE ABREU, R.A. ....	95-118
MOLGAARD, P. and MOREWOOD, D. ....	96-086
MONTGOMERY, S., LUCOTTE, M. and RHEAULT, I. ....	96-065
MONTGOMERY, S. ....	96-064
MOREWOOD, W.D. ....	95-113
.....	95-114
.....	96-087
.....	96-088

MORNEAU, C. et PAYETTE, S. ....	95-056
.....	95-057
MUELLER, W. U. and CORCORAN, P.L. ....	96-062
.....	96-061
.....	96-060
NICHOLS, T. ....	95-072
OUELLON, M.P., RUZ, M.H., et HÉQUETTE, A. ....	95-058
PERIN, S.L. ....	96-085
PERIN, S. and LEAN, D.R.S. ....	95-112
PIERCEY, S.J. and WILTON, D.H.C. ....	96-054
PIWOWAR, J.M., MCINTYRE, K.A. and LEDREW, E.F. ....	95-119
POLISCHUK, S.C., LETCHER, R.J., NORSTROM, R.J. and RAMSAY, M.A. ....	95-101
PURDY, B.G. ....	95-012
PYLE, L.J. and BARNES, C.R. ....	96-089
RAE, R. et VINCENT, W.F. ....	95-059
RICARD, B. ....	95-060
ROBERGE, M. et HILL, P. ....	95-061
ROBERTSON, G.J. ....	95-096
ROBERTSON, S. ....	96-018
.....	96-019
ROSS, J.M. ....	95-013
.....	96-020
.....	96-021
ROUSSEAU, L. et ALLARD, M. ....	95-062
ROY, A.P. and BÉGIN, Y. ....	95-063
ROY, M., LAMOTHE, M. and NIELSEN, E. ....	96-066
SANDERCOCK, B.K. ....	96-079
.....	96-080
SCHAEFER, J.A. and MESSIER, F. ....	95-102
SPENCE, C. ....	96-083
SQUIRES, M.M. and LESACK, L.F.W. ....	96-081

SRIVASTAVA, D.S. and JEFFERIES, R.L. ....	95-110
.....	95-111
SVOBODA, M.Y. ....	96-084
TALLMAN, R.F., TONN, W.M. and HOWLAND, K.L. ....	96-022
.....	96-023
TALLMAN, R.F., TONN, W.M., HOWLAND, K.L. and LITTLE, A. ....	96-024
TALLMAN, R.F., SAURETTE, F. and THERA, T. ....	95-073
TALLMAN, R.F. and THERA, T. ....	95-074
TANG, E.P.Y., TREMBLAY, R. and VINCENT, W.F. ....	96-049
TREMBLAY, A. et CLOUTIER, L. ....	95-081
TREMBLAY, A., LUCOTTE, M. et CLOUTIER, L. ....	95-082
TREMBLAY, J.-P., GAUTHIER, G., LEPAGE, D. and DESROCHERS, A. ....	95-065
TREMBLAY, M. ....	95-064
VÉZINA, S. and VINCENT, W. F. ....	95-066
WASHBROOK, K. ....	96-027
WHITTAM, B. ....	95-097
WIEBE, K.L. ....	96-078
WIEBE, K.L. and BORTOLOTTI, G.R. ....	96-077





## **Index by Discipline**



Anthropology	132
Archaeology	11, 75, 103, 127
Biology	5, 7, 8, 15, 17, 18, 19, 20, 21, 22, 24, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 46, 47, 52, 53, 63, 66, 67, 69, 70, 71, 72, 84, 96, 98, 105, 107, 108, 112, 113, 115, 116, 119, 120, 121, 122, 123, 135, 136, 137, 138, 139, 140, 141, 142, 143, 146, 149
Botany	11
Criminology	76
Education	132
Environmental Sciences/Ecology	6, 9, 10, 27, 45, 55, 61, 62, 64, 66, 68, 73, 78, 79, 80, 81, 83, 95, 96, 99, 100, 101, 145, 146, 148, 151, 152
Forestry	118
Physical Geography	7, 14, 18, 22, 23, 25, 26, 33, 34, 39, 42, 43, 44, 45, 49, 50, 51, 64, 65, 67, 86, 87, 94, 97, 99, 102, 102, 109, 111, 112, 114, 115, 116, 117, 119, 121, 122, 125, 126, 126, 129, 131, 133, 134, 134, 135, 136, 139, 152
Geology	33, 57, 58, 59, 128
Health/Medicine	89

History	133
Human Geography	85
Law	50
Linguistics	77
Resource Management	5, 9, 52, 85, 89, 90, 93, 97, 98, 108
Sociology	51
Zoology	70, 94, 104, 118, 147, 148

## **Index by Fieldwork Location**



Aishihik	148
Alexandra Fiord, Ellesmere Island, N.W.T.	9, 83, 84, 151, 152
Arctic Red River, N.W.T.	7
Arctique canadien	53
Athabasca Sand Dunes, Northern Saskatchewan	11
Baffin Island, N.W.T.	89
Baffin Region, N.W.T.	76
Barrow Strait, N.W.T.	86
Bathurst Island, N.W.T.	139
Beaulieu Rapids Formation, N.W.T.	57, 58, 59, 131
Besnard Lake, Northern Saskatchewan	71, 72, 140, 141, 142, 143
Bylot Island, N.W.T.	19, 24, 30, 31, 32, 36, 37, 38, 40, 46, 112, 118, 119
Canadian Arctic	31
Canadian Beaufort Sea	22
Canol Road, Mackenzie Mountains, N.W.T.	5
CANOL Pipeline Corridor, N.W.T.	95
Cape Herschel, Ellesmere Island, N.W.T.	63, 64
Churchill, Northern Manitoba	15, 55, 69, 73, 140
Coats Island, N.W.T.	69, 138
Cornwall Island, N.W.T.	97
Cross Lake Community, Northern Manitoba	51
Cyclops Peninsula, N.W.T.	58
Daring Lake	148
Détroit de Manitousuk, Québec nordique	23, 42, 112, 116, 121
Ellesmere Island, N.W.T.	102
Fort Smith, N.W.T.	93
Grande-rivière-à-la-Baleine, Québec nordique	26, 44
Greenland	11, 103
High Arctic	64, 66
Hotchkiss and Lutose, Northern Alberta; Sandy Lake, N.W.T.	6
Hudson Bay, Northern Québec	18, 94, 116, 139
Inukjuak and Kangiqsujaq, Northern Québec	127
Inukjuak, Northern Québec	132
James Bay and Hudson Bay, Northern Québec	116
Kangiqsualujjuak, Québec nordique	34, 38
Keskarrah Formation	134
Kluane Lake, Yukon	6, 79, 147
Kluane National Park Reserve, Yukon	89, 90
Kluane, Yukon	96, 107
Kuujjuaraapik, Québec nordique	25, 26, 114
La Pérouse Bay, Northern Manitoba	78, 79, 80
Labrador	17, 43, 45, 85, 115

Lac à l'Eau Clair, Hudson Bay, Québec	20
Lac Bienville, Québec nordique	21, 25, 27, 45, 114, 115, 119, 122
Lake Laberge, Yukon	10, 96
Little Cornwallis Island, N.W.T.	75
Lower Dumbrell Lake, Northern Ellesmere Island, N.W.T.	64
Lowther Island, Resolute Bay, N.W.T.	50, 51, 125
Mackenzie Delta, N.W.T.	66, 137
Mackenzie River, N.W.T.	52
Macmillan Pass, N.W.T.	7
Manitounuk Sound, Hudson Bay, Québec	40, 111
Mast River Delta, La Pérouse Bay, Northern Manitoba	70
Mer de Beaufort	22
Mould Bay, Prince Patrick Island, N.W.T.	81
N.W.T.	52, 72, 77, 123, 126
Nelson River, Hudson Bay, Northern Manitoba	136
Nome, Alaska	145, 146
Norilsk and Tiksi, Siberia	68, 138
Northern British Columbia	152
Northern Manitoba and Northern Saskatchewan	50
Northern Ontario and Northern Manitoba	70
Northern Québec	18, 19, 20, 27, 30, 33, 34, 35, 39, 45, 61, 62, 85, 113, 115, 117, 118, 133, 135, 136
Northern Saskatchewan	109
Northern Yukon and Northern Baffin Island	85
Northwest Canada	99
Norway	67
Peltier Formation, N.W.T.	134
Peter Lake, N.W.T.	10
Raquette Lake	133
Resolute Bay, N.W.T.	49, 73, 149
Resolute, N.W.T.	87
Resolute Passage, N.W.T.	28, 29, 47
Rivière Boniface, Québec nordique	44, 122
Rivière George, Québec nordique	41
Rivière George, N.W.T.	120, 121
Shakwak Trench, Yukon	95
Slave River and Arctic Red River, N.W.T.	8
Slave River, Great Slave Lake, N.W.T.	104
Slave River, N.W.T.	105
South Lake, Mackenzie Delta, N.W.T.	146
South-Central Yukon	94
Subarctique	42
Taymyr Peninsula, Siberia	68
Thompson, Northern Manitoba	67
Torngat Mountains, Labrador	129
Trapridge Glacier, Yukon	14
Tuktoyaktuk Peninsula, N.W.T.	13



Umiakoviarusek Lake, Labrador .....	128
Victor Bay Formation, Northwestern Baffin Island, N.W.T. ....	65
Victoria Island, Canadian Arctic .....	73
Walker Bay, Kent Peninsula, N.W.T. ....	24
Western Hudson Bay .....	98
Western Settlement Greenland .....	103
Wood Buffalo National Park, N.W.T. ....	10, 97, 98
Yukon .....	9, 99, 100, 101, 108