

Arctic WOLVES



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Field Reports 2007

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Field site :

Alert, Ellesmere Island (NU)

Date of activities in the field

23 May to 13 August 2007

Field personnel

Dr. R.I.G. Morrison, principal investigator, Canadian Wildlife Service

Dr. F. Vezina, post-doctoral researcher

C.E. Morrison, field assistant

Jean-Rémi Julien, IPY field assistant (summer student)

Maryse Cloutier, IPY field assistant (summer student)

Planned activities

Shorebirds

- Capture and band shorebirds
- Collection of blood samples for DNA and blood metabolite determinations
- Measurement of Basal Metabolic Rate of shorebirds
- Resighting of previously colour-banded birds
- Monitor timing of shorebird arrival and breeding
- Determination of breeding densities through coverage of survey plots
- Estimation of hatch success from nest monitoring
- Documenting species composition in area
- Artificial nest experiments, to assess annual and spatial variation in predation pressure
- Collaboration with Arctic PRISM IPY project to carry out additional plot surveys for shorebirds and other birds

Long-tailed Jaegers

- Determination of abundance of breeding

Insects

- Determination of seasonal abundance of invertebrates using pitfall traps and Malaise traps

Small mammals

- Monitoring of lemming abundance using snap traps

Plants

- Determination of standing crop and primary production

Logistics

The project received outstanding support from Canadian Forces personnel at CFS Alert during the 2007 IPY activities, as it has in previous years during research operations in the area.

Field activities

Bird banding

A total of 198 birds were captured during the field season, including 181 during the post-arrival period from late May to the latter half of June. Blood samples were obtained from all birds to determine blood metabolite levels and for DNA-sexing, and Basal Metabolic Rate was measured for 54 birds. Flocks were scanned regularly for the presence of colour-banded individuals. Up to five birds previously colour-banded at Alert were seen in northern Norway in May 2007 during their return migration to the breeding grounds.

Artificial nest experiments

Following IPY protocols, two random sets of 20 nests were distributed over two 2 km² plots located on coastal tundra and plateau habitats, respectively. Each plot was run twice, first in the latter half of June and again from mid July. In addition, a third set of 22 randomly located nests set at intervals of approximately 0.5 km along a transect was run twice using protocols developed in previous years at Alert. In addition, a “long line” of 20 randomly located single quail and single chicken eggs was set running from Alert to Kirk Lake for comparison with studies in previous years at Alert.

Pitfalls

Invertebrate abundance was measured at four lines of five pitfall traps located in different habitats in the Alert area for comparison with studies in previous years. Two lines of five Malaise traps were set up in marsh and dry tundra habitats on the shores of Alert Inlet, with invertebrates being collected every two days from the latter half of June to early August in accordance with IPY protocols. Standard pitfalls (five) were also run at the Malaise trap sites.

Plot surveys

Ten plots, which were generally 12 ha in area, were surveyed by a team of two. Four of the plots were rope dragged and six were visited using the rapid survey method. A further set of 30 plots (14 rope drags, 16 rapid) was surveyed in collaboration with the Arctic PRISM IPY project (PI Vicky Johnston, CWS).

Shorebird, predator, and wildlife monitoring

Nests found during fieldwork and plot surveys were visited regularly to determine nesting phenology and hatch success. Habitat data were recorded in the immediate vicinity of the nest and in the general area. Numbers and locations of Long-tailed Jaeger nests were monitored throughout the season. Records were maintained of sightings of other potential predators including Arctic foxes and Arctic wolves, as well as of other wildlife occurring in the area. Daily species logs were kept throughout the season at two set locations and during travel through the Alert area during the course of fieldwork.

Lemmings

Four trap lines (snap traps) were installed between 28 July and 4 August 2007, two in wet/damp habitats and two in dry habitats.

Primary production and standing crop

Vegetation sampling was carried out at four separate locations, two in damp, marshy areas and two in drier, poorly vegetated habitats. Sampling took place between 30 July and 5 August 2007.

Snowmelt

Snow cover was monitored visually throughout the summer from two vantage points that allowed estimation of cover over a variety of flat and sloped terrain.

Field site :
Bylot Island (NU)

Date of activities in the field

16 May to 20 August 2007

Field personnel

Gilles Gauthier, principal investigator, Université Laval
Dominique Berteaux, principal investigator, Université du Québec à Rimouski
Joel Bêty, principal investigator, Université du Québec à Rimouski
Marie-Christine Cadieux, research assistant, Université Laval
Cédric Juillet, PhD student, Université Laval
Madeleine Doiron, PhD student, Université Laval
Jean-François Therrien, PhD student, Université Laval
Laura McKinnon, PhD student, Université du Québec à Rimouski
Arnaud Tarroux, PhD student, Université du Québec à Rimouski
Daniel Gallant, Ph.D. student, Université du Québec à Rimouski
David Duchesne, MSc student, Université Laval
Marc-André Valiquette, MSc student, Université du Québec à Rimouski
Cassandra Cameron, MSc student, Université du Québec à Rimouski
Manon Morrissette, MSc student, Université du Québec à Rimouski
Antoine Richard, BSc student, Université Laval
Mélanie Veilleux-Nolin, BSc student, Université Laval
Julie Tremblay, BSc student, Université Laval
Eliane Valiquette, BSc student, Université Laval
François Rousseu, BSc student, Université du Québec à Rimouski
François Racine, BSc student, Université du Québec à Rimouski
Ludovic Jolicoeur, BSc student, Université du Québec à Rimouski
Aurélié Bourbeau-Lemieux, BSc student, Université du Québec à Rimouski
Marten Stoffel, technician, University of Saskatchewan
Joassie Ootoova, Inuit field assistant
Daniel Ootoova, Inuit field assistant
Bernie Kilukishak, Inuit field assistant
Yvan Killiktee, Inuit field assistant

Planned activities

Climate

- Automated recording of weather parameters at 3 stations
- Recording of snow cover and snow depth in spring

Plants

- Sampling of standing crop and primary production of vascular plants in wetlands and mesic tundra

Field site: Bylot Island

- Annual impact of goose grazing on wetlands (exclosures)
- Sampling of standing crop and primary production of mosses

Snow geese

- Measure of goose nesting density
- Measure of reproductive success (pre-hatch and post-hatch)

Shorebirds and insects

- Measure of nesting density
- Measure of reproductive success (pre-hatch and post-hatch)
- Experiments on predation pressure with artificial nests
- Sampling of seasonal abundance of insects

Small mammals

- Annual abundance using snap-traps
- Seasonal abundance and demography using live-trapping
- Sampling and characterization of winter nests to measure winter abundance, demography and habitat use
- Study of sub-nivean thermal environment
- Setting up of snow-fence experiment

Arctic/red foxes

- Monitoring of known dens to measure abundance and reproductive success
- Sampling of blood and hair for isotopic and genetic analyses
- Collection of scats for diet analysis
- Marking of adult and young to study demography
- Marking of adults with satellite radios to study year-round foraging strategy

Avian predators

- Measure of nesting density of raptors and seabirds
- Measure of their reproductive success
- Collection of regurgitation pellets for diet analysis
- Sampling of blood for isotopic analyses
- Observation of prey delivery rates at nests (visually and with cameras)
- Marking of gulls, jaegers and owls for demographic studies
- Marking of Snowy owls with satellite transmitters to study long-distance movements

Logistics

Logistics at the Bylot Island field station was challenging this summer due to the size of the field crew (a record high) and of the amount of activities taking place. We did not experience major logistic problems. The biggest problem was perhaps a reduced availability of the helicopter, which we had to share with more crews than in past years in the Pond Inlet area. The machine also broke down twice during the summer, which delayed a few activities but, fortunately, repairs were made quickly. Weather was also exceptionally good during most of the summer, and thus we lost very few field days due to bad weather.

Field work was conducted over a total study area of about 400 km² on Bylot Island. Within this area, we had 2 camps as usual, the Camp-1 (Base-camp) and the Camp-2, 30 km away. Most activities were conducted on foot in two core areas of about 50 km² around each camp. Camp-1 is a prime brood-rearing area for snow geese whereas Camp-2 is located in the center of the snow goose nesting colony. Snowmobiles, helicopter, and temporary fly camps were used

extensively for work conducted outside the two core areas, which mainly concerned predators (foxes and raptors).

Field activities

Climate

We retrieved weather data from our 3 automated recording stations without problems. Most of the sensors functioned normally throughout the winter. The early spring was cool but from mid June to our departure in August we had exceptionally sunny, warm and dry weather. Our snow-depth transects showed that snow-melt was nonetheless early, in part because the snow-pack was thin at the end of the winter, and we had warm temperature starting after the first week of June.

Plants

We established a total of 36 goose exclosures in wetlands at 3 sites (Camp-1, Camp-2 and Dufour Point, 12 exclosures per site) in June. We sampled above-ground biomass inside and outside 24 of these exclosures in mid August to determine plant production and the impact of goose grazing (the Dufour Point site could not be sampled in August due to lack of time). Plant production was lower than in the previous 3 years but very close to the 18-year average recorded on Bylot Island. Goose grazing impact was relatively low this year, which is surprising considering the good production (see below). We measured primary production of mesic habitat at 12 exclosures in this habitat by sampling biomass at the beginning and the end of the season. However, due to time constraint, sampling dates were not ideal (i.e. relatively late in spring and relatively late at the end of the summer). Finally, mosses were sampled at 6 different sites to measure their production and biomass (these data were collected by a concomitant project examining the long-term response of tundra plants to sustained fertilization).

Snow geese

We surveyed about 400 nests in the colony (Camp-2) and monitored their reproductive success. We web-tagged more than 2400 young at hatch, banded 4200 adults and young in August around Camp-1, recaptured several hundred marked birds and measured close to 1000 goslings to monitor their growth. Snow goose arrival was one of the latest on record, possibly due to harsh conditions encountered during the spring migration in northern Quebec where the spring melt was very late this year. Geese started nesting immediately upon arrival on Bylot Island but the peak laying date was delayed compared to the long-term average. The nesting density was relatively high, indicating a good reproductive effort by the population, and clutch size was high. Predation rate on nests was low, especially by foxes, and thus nesting success was very high. Survival of young during the summer was apparently good because the young:adult ratio in our banding drives in August was above the long-term average.

Shorebirds and insects

We documented the presence of a total of 8 shorebird species at Camp-1 and Camp-2. Twenty-seven shorebird nests of 5 species were monitored. The most abundant nesting birds were the Baird's and White-rumped Sandpipers. Nest density was low and arrival and lay dates were late relative to previous years. This was likely caused by harsh weather conditions encountered in the low arctic during the spring migration. In addition to the monitoring of natural nests, 160 artificial nests were deployed. Predation pressure on natural and artificial nests was low likely due to an increase in the abundance of lemmings on Bylot Island. Arctic fox was the

only shorebird egg predator (identified using remote camera). Sixty-eight shorebirds were banded at the nest. Twenty-three broods were tracked over a period of up to 18 days.

Seasonal changes in diversity and abundance of insects were determined using 10 pitfall traps deployed at both wetland and mesic tundra habitats (5 traps per habitats) at Camp 1 and Camp 2. At Camp 1, an additional 5 pitfall traps were placed in the snow-fence experimental plot. All pitfall traps were checked every 2 days (June 19 to August 18 at Camp 1 and June 18 to July 18 at Camp 2) and a total of 588 samples were collected.

Small mammals

We conducted small-mammal live-trapping in two grids (12 x 12 traps), one in wetland habitat and one in mesic habitat at Camp-1. We trapped lemmings over 3-day periods 4 times in each grid from mid-June to mid-August. A third grid set up on the snow-fence experimental plot (10x10 traps) and trapped once (mid-August). The snow fence was set up on this third grid in late July (300 x 300m; 1500m of snow fence erected). We conducted snap-trapping survey in July at 3 sites: Camp-1, Camp-2 and a site half-way in between, near owl nesting areas (see below). We ran a large number of transects for lemming winter nests and characterized the habitat at winter nest sites and random sites. We also deployed more than 50 temperature loggers at the end of the summer at winter nest sites found this summer and random sites. Temperature data and snow depth will be retrieved next summer.

Our different indices of lemming abundance yielded variable results. Live-trapping at Camp-1 indicated a very low abundance of lemmings, comparable to 2006. Snap-trapping in July suggested a moderately low abundance of lemmings at both camps, higher than in 2006. Winter nest surveys also indicated moderate lemming abundance. Field impressions suggest that lemmings were quite abundant at snow-melt but relatively scarce by late summer. However, the most noteworthy is that in both snap-trapping and live-trapping, collared were much more abundant than brown lemmings. These data suggest that collared lemmings reached a peak this year but not brown, which is unusual (in previous peaks, both species were synchronous, and brown far outnumbered collared in a peak year). The failure of brown lemming to peak this year apparently explains why overall abundance of lemmings was at best moderate this year. We were able to collect 210 winter nests of lemmings and to sample the habitat at most of these nests. By mid-August, several portions of the snow fence were leaning heavily on the side as the ground had melted around the steel T-bars (several of the bars could not be driven to the targeted depth in July due to the permafrost). Many bars were hammered in again in August and several guy ropes were installed to prevent leaning (but more will be needed next year).

Arctic/red foxes

We inspected each den in the study area (n=99) for signs of use by foxes and presence of reproductive foxes with cubs. For each reproductive den, we recorded minimum litter size and trapped cubs and adults whenever possible. We collected samples of winter and summer fur, blood, and scats for diet and genetic analyses. GPS (n = 14) and Argos (n=7) collars were fitted on adults. This year we also started to use 8 automatic colour cameras to monitor activity of adults and cubs at the dens.

We found 60 dens with signs of activity and 17 of them were used for reproduction. Ten litters of arctic fox were produced, ranging from 3 to 12 cubs (a total of 67 cubs were observed). Four litters were moved between dens, some of them several times. We captured 22 adult and 50 juvenile arctic foxes. Four adults had already been captured and tagged in 2003-2006. No red fox

was observed. All dens with reproduction were located at least 18 km south of Camp 1, most of them around the goose colony or further south. Unfortunately, the drop-off mechanisms of the 14 GPS collars failed so that we could only recover 5 collars through recaptures. We hope to recover a few more next year. Argos collars show that foxes are still on their territory by the end of September. Automatic cameras proved very useful and allowed us to gather information on litter size, daily activity patterns, and prey items brought back to the den.

Avian predators

We ran a number of transects to find raptor and seabird nests but few were found during these systematic searches. Most nests were found opportunistically, especially for jaegers. We revisited most nests found to monitor their success, collected pellets at owl and gull nests, and deployed 10 automatic-triggered cameras at several nests to monitor prey delivery rates of adults. We captured adults and young at several nests to band them and to collect blood samples for isotopic analyses.

We found 17 owl nests but none near Camp-1, which is usually a prime nesting area for them; most nests were scattered over a large area between Camp-1 and Camp-2 (up to 300 km²). We were able to trap 12 female owls at the nest and to mark them with as many ARGOS transmitters. By the end of September, all transmitters were still operational, 9 had left Bylot Island, and at least 7 of them were clearly migrating south (up to 700 km away from Bylot Island). Nesting success of owls was relatively low with a lot of clutch attrition, both before and after hatch, and several total failures during chick-rearing. We also found 9 rough-legged hawk nests but these were scattered over a very large area and few of these nests could be monitored. We found 22 glaucous gull nests, 29 long-tailed jaeger nests and 1 parasitic jaeger nest. Nesting success of these seabirds was generally good. We marked 4 adult gulls and 8 adult jaegers. We collected several dozen samples of pellets at owl and gull nests and we collected blood samples on 21 owls (11 adults and 10 young), 8 jaegers and 13 gulls (4 adults and 9 young).

Field site :

Cape Churchill (MB), La Perouse Bay (MB), Akimiski Island (NU), James Bay (ON) and Daring Lake (NWT)

Date of activities in the field

Cape Churchill and La Pérouse Bay: 16 April to 15 August 2007

Akimiski Island and James Bay: 23 May to 1 August 2007

Daring Lake: 7 May to 31 August 2007

Field personnel

Cape Churchill and La Pérouse Bay

Robert L. Jefferies, principal investigator, University of Toronto

Kate Edwards, PhD student

Emma Horrigan, MSc student

Anna Simonsen, graduate summer assistant

Shannon Refvik, undergraduate summer assistant

Yue Jiang, undergraduate summer assistant

Robert F. Rockwell, principal investigator, American Museum of Natural History

Linda Gormezano, PhD student

Kit Schnaars, PhD student

Elise Gornish, PhD student

Chris Witte, summer field assistant

Frank Uvino, summer field assistant

Mike DiBrizzi, summer field assistant

LeeAnn Fishback, scientific co-ordinator at Churchill Northern Study Center

Hugh Henry, coordinator for methane and carbon dioxide analyses, Univ. of Western Ontario

Akimiski Island and James Bay

Kenneth F. Abraham, principal investigator, Ontario Ministry of Natural Resources

Carrie Sadowski, research assistant

Sarah Hagey, research assistant

Daring Lake

Paul Grogan, principal investigator, Queen's University

Haiyan Chu, post-doctoral fellow

Mathew Van Koughnett, MSc student

Dragana Rakic, summer field assistant

Planned activities

- Establishment of protocols for surveys of biodiversity with an emphasis on birds, vascular plants and mammals

- Examination of long-term data sets of dates of arrival of migrant birds, nesting phenology of snow geese, above-ground plant biomass, flowering dates of vascular plants
- Establishment of transects, plots, intensive study sites to monitor changes in soil-microbial-plant interactions in relation to climate, season, herbivory and disturbance in intertidal salt marshes and wet sedge meadows
- Measurement of nitrogen fixation and denitrification in wet sedge meadows
- Measurement of above-ground net primary production in grazed and ungrazed wet sedge meadows, soil bacteria and the link to clinical bacterial pathogens
- Survey of goose numbers, and fox dens and the use of TK to provide a further long-term temporal perspective on changes in numbers of geese and foxes. Involvement of elders and hunters in discussion groups and interviews to meet this objective in the Churchill area and in northern Ontario.

Logistics

R.F. Rockwell experienced some difficulty in obtaining helicopter support that affected the success of some of the surveys. The absence of a fume hood at the CNSC prevented Kate Edwards from carrying out the extraction of phospholipid fatty acids in soils safely.

Field activities

Cape Churchill Peninsula (CCP), La Pérouse Bay (LPB) and Daring Lake (DL)

Recording of flowering dates and date of arrival and presence of bird species and daily weather conditions (CCP). Survey flights to record goose densities and dispersion (CCP). Recording of nesting densities and hatching success of snow geese and densities and dispersion of fox dens (CCP & LPB). Banding of lesser snow geese (LPB, CCP) (5000). Deployment of plant recovery exclosures following severe foraging by geese and loss of vegetation (CCP). Measurement of soil properties including salinity and redox level along transects where loss of vegetation has occurred as a result of goose foraging (CCP). Changes in soil properties, nutrient availability, microbial biomass, and plant growth at the late winter-spring transition. ¹⁵N studies to determine partitioning of N between soil, microbes and plants at the transition. Laboratory experiments to simulate these changes. Measurement of methane and CO₂ fluxes from wetland soils during the snow-free season (All of the above conducted in wet sedge meadows close to the Churchill Northern Studies Centre). A comparison of rates of nitrogen fixation in different habitats at Cape Churchill and Daring Lake (CCP, DL). A similar comparison of decomposition of plant litter using litter bags (CCP, DL). Ion exchange resins were harvested at Daring Lake to assess nutrient availability during the growing season (DL). Determination of rates of denitrification and the controls on nitrate availability that appear to regulate denitrification (DL). Measurement of above- and below-ground standing crop in wet sedge meadows and an intertidal salt marsh in grazed and ungrazed areas. The nutrient content of the plant samples will be analysed and the results of the dry weight of biomass will be used to estimate net primary production (CCP). The effects of nutrient additions and natural or simulated grazing on above- and below- ground plant biomass and on microbial biomass in an intertidal marsh and a wet sedge meadow. The biomass samples will be analysed for nutrient content (CCP). Weekly recording of densities of goose faecal droppings along three transects at each of three sites in sedge meadows (CCP). Collection of soil samples to type soil bacteria.

The activities planned by Robert F. Rockwell and his team have been completed and full reports are posted at: <ftp://ftp.amnh.org/pub/people/rfr/downloads/wapusk/reports>

Field site: Cape Churchill, La Perouse Bay, Akimiski Island, James Bay, Daring Lake

Akimiski Island and James Bay

Recording of date of arrival and daily presence/abundance of bird species and daily weather conditions. Daily recording of potential predators during incubation and hatch periods of geese. Ground surveys and aerial survey flights to record Canada and snow geese (limited) and densities and location of fox dens. Banding of Canada (4000) and lesser snow geese (5000). Recording of peak biomass of the two intertidal primary forage species (*Puccinellia phryganodes*, *Carex subspathacea*). Deployment of exclosures to study effects of simulated goose foraging on above-ground *Carex aquatilis* biomass; harvested at peak biomass in 2007.

Research projects still pending

Discussions with elders on long-term changes in goose, bear and fox populations on the Cape Churchill Peninsula and northern Ontario (NO) planned for the winter of 2007-2008. Analysis of long-term data sets of biological data (CCP, NO).

Field site :

Fosheim Peninsula, Ellesmere Island (NU)

Date of activities in the field

21 to 27 June and 1 to 7 August 2007

Field personnel

Josée Lefebvre, CWS biologist, principal investigator of ArcticWOLVES
Austin Reed, emeritus scientist with the CWS, collaborator of ArcticWOLVES
Louis Lesage, CWS biologist
Francis St-Pierre, CWS wildlife technician
Kendrew Colhoun, Wildfowl & Wetlands Trust, Ireland
Gudmundur Gudmundsson, Icelandic Institute of Natural History
Alyn Walsh, National Parks & Wildlife Service, Ireland
Stuart Bearhop, University of Exeter, United Kingdom

Planned activities

- Plants
 - Determine above-ground primary production/goose exclosures
- Geese
 - Determine abundance, reproductive success
- Small mammals
 - Determine annual abundance using snap-traps
- Foxes
 - Determine abundance and success
 - Collection of scats
- Raptors and Seabirds
 - Determine abundance and reproductive success
 - Diet and foraging
- Insects
 - Determine abundance and phenology
- Weather conditions
- Tabulate daily reports of all species observations

Logistics

The logistics of conducting field work in this remote area was a challenge because of the need to coordinate all of the different activities within a limited time frame. Mechanical difficulties with the helicopter cost us flying time on 21 June, but this delay did not affect field work very much.

Field activities

We arrived at Polar Continental Shelf Project facilities on 20 June. Between 22 and 27 June, many activities were executed on Axel Heiberg Island and on the northern region of the Fosheim Peninsula of Ellesmere Island (approx 1,600 km²), especially around Eastwind Lake. During this week, we evaluated the relative abundance of Greater Snow Geese (GSG) and Eastern High Arctic (EHA) Brants, and estimated the pre-hatch reproductive success of geese. A total of 28 GSG nests (15 nests on Ellesmere Island and 13 nests on Axel Heiberg Island) and 35 Brant nests (17 nests on Brant Island and 17 nests on Shamrock Island) were found. To evaluate the Muskoxen, Arctic hare and Peary Caribou population on the northern region of Fosheim peninsula, we conducted eight aerial transects. These transects allowed us to search for Arctic fox and Arctic wolf dens and to collect samples of hair and scats. Between 24 and 27 June, exclosures were installed in proximity to Eastwind Lake to evaluate the aboveground primary production and to assess the grazing impact by herbivores. In addition, we counted lemming winter nests and we evaluated raptor and seabird abundances. During this trip, a daily report of all species observed was prepared. No activities were done this year on insect abundance and phenology because of the short time available for field work.

During the second week of field work, we checked GSG and Brant nesting success and evaluated the brood sizes and banded approximately 1350 Greater Snow Geese and 150 EHA Brant and 1 Cackling goose. We neck-banded approximately 330 adult females and recaptured 10 birds (8 adult males and 1 subadult female banded on Bylot Island between 1998 and 2006 and 1 adult male banded in Cap Tourmente National Wildlife Refuge in 1997). We also marked 2 adult females with GPS/ARGOS radio-transmitters. We conducted small-mammal snap-trapping in both mesic and wet meadow habitats for population monitoring. We captured only one collared lemming in mesic habitat.

Field site :

Herschel Island, Komakuk and Shingle Point (YT)

Date of activities in the field

26 May to 26 September 2007

Field personnel

Charles Krebs, principal investigator, professor, University of British Columbia

Alice Kenney, research associate, University of British Columbia

Don Reid, research associate, Wildlife Conservation Society Canada

Alistair Blachford, PhD student, University of British Columbia

Frank Doyle, research associate, Wildlife Dynamics Consulting

Michael Nelligan, research associate (private sector)

Maria Leung, research associate (private sector)

Scott Gilbert, instructor, Yukon College

Dave Mossop, instructor, Yukon College

Kawina Robichaud, field technician, Yukon College

Edward McLeod, field technician, Aklavik

Gerald Noksana, Inuvialuit student mentorship

Alex Gordon, Inuvialuit student mentorship

Doug Morris, professor, Lakehead University

Deb Moore, PhD student, Lakehead University

Todd Burnside, field technician, Lakehead University

Georges-Olivier Cimon, field technician

Marco Müller, field technician

Liz Hofer, research associate (private sector)

Logistics

Herschel Island has proven to have strong advantages and disadvantages as a field site. Advantages include strong support from Qikiqtaruk Park staff in providing facilities at Pauline Cove for storage, camp maintenance, and local travel, including the use of some buildings while preparing our own tent camp, plus the staff's strong record of gathering local natural history data to augment and compare to our data. Major disadvantages include (i) small choice of easily accessible land base for sampling, and (ii) reduced capacity of the fixed wing landing strip due to storm in fall 2006 and inability to restore the full strip (Twin Otters now have reduced weight limits for landing and especially take-off). Komakuk provided an easily accessible site for our work, but would require a more substantial tent structure (for cooking and drying out) for future work.

Field activities

Herschel Island

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
Snow Cover	One snow transect of 25 stations, 10 m apart run from 29 May through to full melt (8 June) in wet lowland. Pattern of snow melt in major habitats recorded from 29 May to 15 June	Full snow cover in low elevation wetland lost within 10 days in early June. Substantial areas of the well incised topography have very deep drifts with snow lasting well into July.	A generally late snow melt in the northern Yukon, proceeded very quickly once the warmer weather arrived	None
Primary Production	Graminoid communities sampled for NPP with clip plots in early August (peak of growth). Herbivore exclosures established in <i>Dryas-Salix</i> heath (n=4) & in <i>Eriophorum-Salix</i> upland tussock (n=4)	Data not fully compiled	Herschel is noticeably more productive than many western arctic sites at similar latitude	Spring and peak growth paired clip plots in two dominant upland habitats (<i>Dryas-Salix</i> heath, and <i>Eriophorum-Salix</i> tundra).
Insects	5 traps in wet alluvial fan & 5 traps in dry upland heath established and run continuously from 15 June to 5 August. Butterflies collected and prepared for identification. Phenology of emergence of adult insects recorded	Arachnids dominate early, with coleopterans, dipterans and crane flies dominant in July. Increasing rate of capture, with strong variability related to weather.	Abundant and diverse arthropod fauna. The Arachnid abundance seemed to be in advance of fledging, but fledging coincided quite well with strong coleopteran and dipteran abundance.	Repeat sampling in one of the 2007 habitats, and move sampling to one other upland community (<i>Eriophorum</i> tussock)
Bird Migration	Daily transect (c.1.1 km) ranging from low wetland to dry upland run from 29 May to 15 June, covering the major migration period	Documentation of strong pulse in arrival and passage of most bird groups, esp. shorebirds and waterfowl.	The wetland area near the camp is a key staging ground for the island as a whole.	Repeat (Start earlier in season if possible)
Raptor Abundance – point observations	10 min surveys from high point above camp (29 May to 15 June)	Few observations overall, and not as productive as the transect.	This sampling effort does not produce much return, and was not continued beyond the period of migration.	Repeat in conjunction with the Bird Migration transect

Herschel Island (continued)

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
Raptor Abundance – nest searches	The eastern half of the island (c. 50 sq km) well searched for nests of RLHA, PEFA, SEOW, SNOW and LTJA	No breeding by Snowy Owls, despite an estimated 80 birds on the island. Nests of RLHA (4), PEFA (5), SEOW (1), and LTJA (4), with eggs. PEFA apparently killing SEOW. Two RLHA & 1 PEFA nest failed . Full data not yet compiled	Lack of breeding SNOW suggests lemming densities not abundant enough, yet the island is a good area to sustain the birds in years without breeding opportunities elsewhere. PEFA densities on increase historically, and may have influence on densities of other raptors.	Repeat. Lemming densities indicate possible high in spring 2008, so be prepared for SNOW breeding. Need to have a more thorough raptor monitoring survey in place early in season.
Raptor Diet	Pellet collection initiated at or near known nests, and for SNOW generally at perches.	Pellets not yet analysed	PEFA taking lemmings and birds, SNOW taking lemmings.	Repeat. Set up a more wide ranging collection regime in conjunction with nest monitoring.
Passerine and Shorebird Abundance	Two Prism plots established (upland wet and dry communities). These were not searched as frequently as protocol suggests, due to lack of person time and relatively low nesting densities.	Very few shorebirds nesting in the upland areas (only AGPL on Prism plots). Most upland nesters are LALO, SASP & AMPI, with scattered GWGO and ROPT.	The majority of the island is not productive shorebird habitat. The alluvial fan habitat is most productive for shorebirds (but without a PRISM plot this year) – SESA, SEPL, BASA.	Repeat one PRISM plot in upland. Consider a small-scale PRISM plot on the alluvial fan.
Shorebird & Passerine Nesting Success – Direct observations	Sample of at least 70 shorebird and passerine nests tracked from some time in incubation through hatching, and some to fledging.	Data have not been compiled exactly, but indicate earlier mean hatching dates for prominent species (e.g., SESA, LALO) compared to mid-1980s.	Some potential evidence for effects of climate change on phenology. Needs another 1 or 2 years of data.	Repeat.
Shorebird Nesting Success – Experimental Nests	Two trials run with quail eggs as per protocol. (40 nests per trial)	>90% nests depredated within 3 d, mostly by fox.	Arctic fox seems to find the nests quite readily – egg odour plus association with human odour. Difficult to interpret the meaning of these trials.	Do not repeat.
Shorebird and Passerine Nesting Habitat	Most shorebird and passerine nests were subject to habitat description using PRISM manual protocol and form, after fledging.	Data not yet analysed.	Uncertain.	May repeat if value of data are more clear.

Herschel Island (continued)

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
<p>Small Mammal Abundance</p>	<p>One upland 9 ha grid (“Fence”) from 2006 trapped in mid-June, mid July and early Sept; second upland 9 ha grid (“Ridgetop”) established and trapped in mid-June, and trapped in mid-July and early Sept; one 2 ha alluvial fan grid (“Graveyard”) trapped in mid-June, early July and mid Sept.</p> <p>Winter nest counts on all grids.</p> <p>Relative abundance index lines (“Valley”) from 2006 re-trapped in June (low catch). New “Upland” index lines established in early July (moderate catch). All lines re-trapped in Mid Sept (increased catch).</p> <p>Shrew population growing during summer.</p>	<p>Lemmings and voles were abundant in spring, decreasing in mid summer, but often increasing thereafter. Fence grid from 6/ha to 9/ha in Sept); Ridgetop from 8/ha to c. 11/ha in Sept; Graveyard from 15/ha to c. 12/ha in Sept.</p> <p>2006-07 Winter nest densities were high compared to other data sets collected historically. Relatively high proportion (15-30%) of winter nests with weasel predation.</p>	<p>4 principal small mammal habitats : gravel-grass spit by habitation (commensal <i>Microtus economus</i>); Carex-moss wetlands in drainages and alluvial fan (<i>Lemmus</i> and <i>Microtus</i>); upland <i>Dryas-Salix</i> heath (<i>Dicrostonyx</i>); and <i>Eriophorum</i> tussock – <i>Salix</i> (<i>Lemmus</i> and <i>Dicrostonyx</i>) communities.</p>	<p>Spring (June) live trapping of all three grids and 2 sets of index lines.</p> <p>Mid-summer (July) re-trapping of all three grids.</p> <p>Fall (late August or early Sept) re-trapping of all three grids and 2 sets of index lines.</p> <p>Spring (June) counts of all winter nests on all three grids.</p>
<p>Lemming Summer Habitat Selection</p>	<p>Detailed report available from Deb Moore (arcticdeb@gmail.com) . Established and trapped each of 8 microplots 3 times in July and August. Established and ran enhanced cover treatments and estimated activity with tracking tubes.</p>	<p>Preliminary data still to be analysed for habitat isodar.</p> <p>Tracking tube data indicates trend to increased activity in areas with enhanced cover.</p>	<p>Herschel is a reasonable study site to continue this work.</p> <p>Comment from DR: <i>Lemmus</i> habitat included the upland <i>Eriophorum</i> tussock community (which would at first be classified as dry), and Ridgetop grid supported both lemming species in high numbers in late summer, so this habitat is worth thinking of as a study unit.</p>	<p>Continued sampling with these and perhaps other experiments. Details still under consideration.</p>

Herschel Island (continued)

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
Lemming Winter Ecology	<p>Established snow enhancement treatment (5 rows of fencing) on one-half of Fence Grid, with other half as control.</p> <p>Established 35 trapping cylinders with traps for future live-trapping through the snow pack.</p> <p>Established 16 sites with temperature loggers (0, 20 and 40 cm) to monitor winter temperature regimes on each of the three lemming trapping grids, and within the fence treatment on Fence Grid.</p>	No data gathered in fall 2007.	The lack of a control site, plus relatively high topographic relief make Herschel less useful than Komakuk for the snow enhancement experiment. However, Herschel is more useful than Komakuk for winter live-trapping with trapping cylinders placed in terrain of varying winter snow depth to test the hypothesis that lemmings preferentially use terrain with deeper snow.	<p>Spring 2008 – April – live-trapping on Fence grid to quantify relative use of control and treatment zones.</p> <p>Spring 2008 – June – winter nest counts on each of the two zones on Fence Grid.</p> <p>Propose that Komakuk be used for a full 9 ha fence experiment in 2008-09 with fence established in August.</p> <p>Propose that more trapping cylinders be deployed on Herschel for 2008-09 winter to test hypothesis of differential habitat use.</p>
Lemming autumn survival and habitat use.	VHF radio-telemetry on n=25 adult females (mix of species) to quantify Sept. survival and home range use. All data prior to snow fall.	Lemmings still using summer habitat with home range use similar to when lactating. Few exploratory movements and no range shifts. Moderate mortality rate to fox and weasel.	Telemetry is feasible, and could be used into early winter (after snow fall) to test hypothesis of seasonal range shifts with early snowfall.	Consider such field work for Sept / Oct 2008.

Herschel Island (continued)

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
<p>Mammalian Predator Abundance & Diets</p>	<p>Foxes – two dens appear active. One close to camp being used by two adult arctic fox (reproduction uncertain); the second is far from camp and species unknown to date. Remains of at least 3 arctic fox and 1 red fox found having died in winter. Scat collection initiated, and a little snow-tracking started (Sept).</p> <p>Least Weasels – frequent captures in lemming traps. Animals ear-tagged. Large-scale (3 sq km) mark-recapture trapping effort. Scats collected.</p> <p>Wolverine – direct observations indicate some individuals are resident. Scats collected.</p> <p>Grizzly bear. Sign indicates at least one animal on island periodically but not observed.</p> <p>Polar bear. One observed in Sept apparently investigating lemming burrows.</p>	<p>Most fox dens and burrows not active or only getting sporadic use. Fox density appears quite low in eastern half of island. Foxes having high local impact on bird nesting success (alluvial fan and spit near camp – direct observations).</p> <p>7 weasels captured in June on small mammal grids, representing adults and recently weaned juveniles. Individuals moving up to 500 m between captures. Mark-recapture effort over 3 sq km (trap density of c. 60 traps/ sq km) was not successful at catching weasels.</p> <p>5 weasels captured in Sept on small mammal grids, with evidence of summer breeding.</p>	<p>Dynamic balance between fox species is ongoing – arctic fox now occupying den used by red fox in 2005.</p> <p>Quick numerical response of weasels to lemming abundance with winter breeding may have curtailed increase phase. But weasels were unable to curtail summer population growth of lemmings despite continued breeding. A trapping grid for weasels needs to have higher trap density to improve trappability, plus a more potent lure.</p> <p>Need to consider wolverine as a potentially powerful top-down force, as an ungulate, small mammal, and avian nest predator.</p>	<p>Complete aerial survey for all fox dens on the island in late June.</p> <p>Intensive monitoring of fox dens for use, reproduction and diet on eastern half of island from June through Sept.</p> <p>Quantify weasel abundance using winter nests (June survey). Mark recapture popl'n estimate in June (1 sq km with >120 traps).</p> <p>Wolverine and bear abundance recorded incidentally.</p> <p>Serious consideration of snow-tracking work with fox and weasels in early winter (late Sept / October).</p>

Kumakuk and Shingle Point

SUBJECT	WORK ACCOMPLISHED	DATA TREND	INTERPRETATION	WORK in 2008
Small Mammal Abundance - Komakuk	None in June. Late August trapping of index lines (relative abundance) and Snow Grid	Total small mammal abundance was similar from August 2006 to August 2007: Index lines from 8.3/100 trap days to 7.9/100 trap days; Snow grid from MNA 28 to 37. The Lemmus population especially had declined (MNA from 28 to 15), and Microtus had taken over (MNA from 0 to 21). Shrew population irruption during summer 2007 (none caught in 2006; 20 caught in 2007).	If the August 2006 high density of Lemmus had resulted in a peak popl'n in spring 2007, that peak was quickly curtailed during summer 2007. However, there was not strong evidence of predator activity on the intensive study sites or regionally (no SNOW evidence; few fox scats; low incidence of weasel use of winter nests). An alternative hypothesis is that winter 2006-07 conditions precluded strong population growth.	June – live trap index lines and Snow grid and the control Coast grid. Winter nests counts on grids. August – live trap index lines and both grids.
Predator Abundance - Komakuk	General survey of study area for evidence of breeding	PEFA fledged 3 young ; RLHAs from foothills active; Little fox sign; Minimal weasel sign (<10% of a small sample of winter nests)	No clear evidence of a numerical response of predators to a possible increase in lemming densities	June – more thorough regional search for raptor nests and fox dens
Gyrfalcon and Ptarmigan abundance – British Mountains – Shingle Pt lowlands	Aerial surveys in late June of a sample stretch of drainages in British Mountains, and transect on coastal plain to quantify gyrfalcon nesting density and occupation, and ptarmigan abundance	Dave Mossop and assistant flew the surveys. Of 25 gyr aeries, 16 were occupied but only 8 productive. 1.4 young per productive nest. Ptarmigan at moderate to low densities.	Numbers of productive nests and nest productivity both low.	Repeat in 2008.
Lemming Winter Ecology - Komakuk	Sample snow fence and trapping cylinders, and temperature loggers placed in August 2006 re-visited and recovered (no equipment left in the field)	Snow fence had mostly stood up to 12 months of wear. Guy ropes had often broken, and probably need to be more frequent and from both directions with equal tension. Trapping cylinders also mostly in place, and can work. Temp data not yet analysed.	Winter snow fence experiment is a real possibility, with some strengthening of design around guy lines. This study site continues to offer good potential for this experiment because it offers limited topographic relief for much snow accumulation, so a snow fence treatment is likely to have a dramatic effect on snow depth.	Establish snow fence experiment over full 9 ha Snow grid in August.

Field site :

Walker Bay, Kent Peninsula (NT)

Date of activities in the field

17 June to 3 July 2007

Field personnel

Douglas Morris, principal investigator, Lakehead University

Debra Moore, PhD student

Benjamin Dippo, HBSc student

Victoria Danco, NSERC USRA student

Planned activities

- Lemming habitat selection on twelve 0.36 ha grids
- Lemming abundance estimates on two 9-ha grids
- Lemming/weasel winter nest counts on two 9-ha grids and twelve 0.36 ha grids
- Raptor visual surveys
- Incidental surveys
- Climate/weather records

Logistics

1. Our PCSP helicopter was delayed by weather en route from Inuvik to Cambridge Bay. We lost 2 field days as a consequence. Last-minute accommodations in Cambridge Bay were somewhat problematic and very expensive.

2. Another researcher's PCSP equipment was mistakenly sent to Walker Bay on our twin-otter charter that was also delayed by late arrival of research gear ordered several months earlier. Takeoff attempts were complicated by difficult snow conditions and consumed extra fuel. The combination of events meant that we were unable to cache fuel for the 2008 field season.

3. Problems with a grizzly bear and wolf began on 26 June through 3 July. After the first bear encounter we posted sentries each night until our early departure on 3 July. The bear entered camp on two different occasions, and a wolf destroyed our radio antenna. Sentry duty reduced our field effectiveness, and the early departure caused us to miss a third day of field research. Lost time forced us to abandon winter nest surveys and lemming trapping on the second large grid.

Field activities

Lemming habitat selection

We estimated lemming habitat use on all 12 grids with live trapping. We will be able to associate our lemming density data with previously collected habitat measurements, and with previous spatially-explicit data on lemming density and occurrence. Debra Moore's trials with artificial cover and tracking tubes were encouraging. Lemmings used the tubes and left clear tracks. Very preliminary data suggest that increased cover corresponds with reduced predation risk (increased lemming activity).

Lemming abundance

We were able to live-trap only one of the 9-ha grids (former enclosure). Lemmings were moderately abundant (approximately 5 animals per ha in the former enclosure). Eleven of 12 micro-plots contained lemmings. Both species were present on 4 of these grids. Collared lemmings were much more abundant overall than were brown lemmings (63 vs. 12 individuals). Most lemmings were large (50-90 g), and the vast majority were in breeding condition. Densities were somewhat lower than during our most recent survey (2004) when the population appeared to be in decline. Although densities were comparable to those at Herschel Island, historical peak densities at Walker Bay are much higher and we expect that densities should peak either in autumn 2007 or (hopefully) during 2008.

Lemming winter nests

We conducted winter nest surveys on the large 9 ha former enclosure and on all twelve 0.36 ha "micro-grids". Only about 50 or so nests were discovered, and none had been used by weasels. There was no evidence of a recent high in lemming numbers.

Raptor visual surveys

We conducted visual raptor surveys every second evening, but lemming field work made it impossible to standardize the timing of the 10 minute observation periods. Few "raptors" were seen during these surveys.

Incidental surveys

Incidental observations included weasels, one tundra wolf, one grizzly bear, two Arctic foxes (one of the two nearby dens had been used but there was no evidence of breeding), one pair of rough-legged hawks, several sandhill cranes, a handful of jaeger sightings and numerous glaucous gulls. Gizzly bear "digs" in lemming habitat were relatively numerous. One pair of rough-legged hawks nested on the research cabin but abandoned their 3-egg clutch when the helicopter arrived. No snowy owls were seen in the Walker Bay area during 2007.

We recorded all waterfowl nests encountered, but these were few in number (mostly Canada geese, a few greater white-fronted geese, 2 king eiders, 1 tundra swan). We also recorded all shorebird and songbird nests encountered and their GPS locations. The vast majority were lapland longspurs with a few savannah sparrows and horned larks.

Climate records

The Walker Bay weather station was mostly destroyed by a grizzly bear in 2006. The station was to be rebuilt by Bob Reid, Head DIAND in Yellowknife during late July.

Field site :

Northwest Territories Small Mammal Survey (NT)

Date of activities in the field

Norman Wells, Sahtu: 21 to 25 August 2007

Tulita, Sahtu: survey not performed in 2007 due to personnel unavailability

Yellowknife, North Slave: 28 August to 1 September 2007

Bliss Lake, North Slave: 8 to 12 August 2007

Gordon Lake, North Slave: 10 to 14 July 2007

Daring Lake, North Slave: 30 July to 3 August 2007

Fort Simpson, Deh Cho: 28 August to 1 September 2007

Fort Liard, Deh Cho: survey not performed in 2007 due to personnel unavailability

Trout Lake, Deh Cho: survey initiated but abandoned due to lack of time during field daily work

Fort Smith, South Slave: 21 to 25 August 2007

Fort Resolution, South Slave: 14 to 18 August 2007

Inuvik, Inuvialuit-Gwich'in: 11 to 15 September 2007

Tuktoyaktuk, Inuvialuit-Gwich'in: survey not performed due to weather and logistical problems

Anderson River, Inuvialuit-Gwich'in: June (exact dates to be determined)

Field personnel

Norman Wells

Richard Popko, Wildlife Technician, GNWT, Sahtu Region

Tulita

Sahtu Renewable Resources Board personnel not available

Yellowknife

Dr. Suzanne Carrière, biologist, GNWT, Wildlife Division

Robert J. Reid, hydrologist, Indian and Northern Affairs Canada

Bliss Lake

Dayna Meredith, summer student, GNWT

Gordon Lake

Dr. Suzanne Carrière, biologist, GNWT, Wildlife Division

Michele Stacey, summer student, GNWT, Wildlife Division

Daring Lake

Steve Matthews, biologist, GNWT, Wildlife Division

students at Daring Lake Tundra Science Camp

Fort Simpson

Danny Allaire, wildlife technician

Dr. Nic Larter, biologist, GNWT, Dehcho Region

Fort Liard

GNWT personnel not available

Trout Lake

Steve Moore, biologist, EBA

Fort Smith

Rick Mandeville, wildlife technician, GNWT, South Slave Region

Fort Resolution

Rick Mandeville, wildlife technician, GNWT, South Slave Region

Robert Sayine Jr., Deninu K'ue First Nation

Inuvik

Rose Adams, wildlife technician

Tracy Davison, biologist

Kevin Allen, Renewable Resource Officer, GNWT, Inuvik Region

Anderson River

Jessica Beaubier, Waterfowl Technician, Mackenzie Delta Programs, Inuvik, NT

Planned activities

Mice, voles and lemmings are snap-trapped (Museum Specials), except in Norman Wells where they are live-trapped (Sherman traps) on standardized permanent trap lines. Usually, 100 traps are out for 5 nights. Trap lines are checked at least each morning before 10:00. The trapping is planned for August each year, but at some sites the survey is performed in June, July or September if other activities require a change in timing.

Logistics

Survey sites are within driving distance from a community, except for five sites (Trout Lake, near Tuktoyaktuk, Anderson River, Bliss Lake and Gordon Lake). The survey from Tuktoyaktuk was not performed due to weather, and aircraft and personnel availability problems. The survey in Trout Lake was not performed due to time conflict with other activities in the field. The survey was not the priority activity for that site, where EBA was performing an environmental assessment of a protected area candidate. Of the community surveys, only Fort Liard and Tulita were not performed in 2007 due to personnel turnover or unavailability

Field activities

Most site surveys are performed by GNWT personnel. Surveys were performed either using the standard protocol or not performed at all. The protocol allows for timing modifications to fit with other field requirements. The survey at Anderson River was performed in June as part of a study on predation by grizzly bear and alternative prey species such as waterfowl nests and small mammals.