Summary

Government of Yukon

Yukon North Slope Wildlife Research Projects

2000 to 2003

Prepared September, 2003

Yukon
Environment

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Project title	Status	Time frame
Yukon muskox studies	Ongoing	1999 - 2005

Rationale / management objective

Muskoxen are relatively new to the Yukon North Slope. The "parent" population of muskox in the Arctic National Wildlife Refuge (ANWR) has been studied in depth since 1983. Muskox from this herd were seen in the Yukon the same year they were reintroduced, and sightings have increased slowly. Starting in 1994, muskox have been seen each year in excess of 100 kilometers south of the Yukon North Slope. Despite the growing number of muskox in the territory, the first full survey of muskox in the Yukon was in 1993. Three subsequent population surveys and composition counts yielded varying results.

This population monitoring program consists of numerous jobs:

1) To estimate the late winter population size and document distribution of muskoxen in the survey area
2) To document the late winter sex and age composition of muskox in the survey area
3) To maintain 10 satellite radio collars on muskoxen for 3 years to:
    i) To check if we missed groups during the census
    ii) To monitor the movement and distribution of muskoxen
    iii) To determine annual and season range use of collared muskoxen
    iv) To determine habitat use by muskoxen
    v) To estimate birth rate, calf survival, calving interval, and mortality rate of collared individuals
4) To calculate activity budgets of muskoxen and possible relate to muskoxen-caribou interactions
5) To develop and implement a system for local travelers to report their sightings
6) To collect samples to determine the presence, levels and effects of parasites and disease in muskoxen, caribou and Dall's sheep.
7) To collect samples to determine the genetic differences between North Slope and NWT mainland muskoxen
8) To develop a population model to estimate the effects of harvest on the population

Project description

The study area was determined by choosing the area where the majority of muskoxen are most often seen. The area varied slightly from year to year but was generally bounded the Yukon-Alaska border to the west, Shingle Point to the east and the height of land to the south.

➔ Muskox abundance and composition

March aerial surveys provide the most reliable population estimates as we have little confidence in sightability during aerial surveys in July. Sightings outside of the aerial survey area that were reported to us (Job # 5) were included in the total estimates. During composition counts, we classified muskoxen into 8 sex and age categories (calves or short yearlings in late winter counts, females aged 2 years, 3 years and 4+ years, males aged 2 years, 3 years, 4 years and 5+ years).

➔ Distribution and movements

Eight cow and 2 bull muskoxen from across the distribution of animals were captured in 1999 and fitted with 3-year satellite collars (7 % of the 1993 estimated population of 157 on the Yukon North Slope). In 2002, the 5 remaining collared muskoxen were recaptured and 4 were fitted with new satellite collars. Another 4 muskox were fitted with new collars. These will transmit until 2005. Seasonal distribution maps and home ranges were developed using ArcView. The core area of muskox occupation remained relatively unchanged for the duration of the study (Appendix 1). An exception is the dispersal of mixed sex groups that moved into the Babbage River drainage around 1995. Previously, bull only groups occupied this area. We sent 1:1,000,000 scale maps to community Renewable Resources Councils and Hunters and Trappers Committees in Old Crow, Yukon and Aklavik, Ft. McPherson and Tsiigehtchic, NWT for local travelers to map sightings of muskoxen.

➔ Habitat use

The locations from the first set of satellite collars (1999 to 2001) were buffered with the accuracy assigned by Service Argos and overlain on to a vegetation map developed by the Canadian Wildlife Service and YTG using ArcInfo. The area covered by the buffer for each location was clipped out of the vegetation map and the area of each vegetation class was added to the attributes for that location. Average vegetation class was calculated by muskoxen, by season. Elevation as determined using ArcInfo will be added as an attribute to each point location for analyses.

➔ Activity budgets

In early July 2000, activity scans were done on 51 muskoxen in 11groups of muskoxen for 4224 muskox*minutes. Activity categories were: lying, standing, walking, feeding, grazing, vigilant. On 2 groups, collared muskoxen were used as focal animals for 5 minute continuous scans.

➔ Genetic studies

Hairs with follicles attached were taken from the shoulder of each muskox and samples were frozen. These samples were included in GNWT's genetic comparison of muskoxen native to the NWT mainland and re-introduced muskoxen from Greenland stock. These samples are being analyzed.

➔ Parasites and diseases

Fecal samples were taken from the muskox during captures and sent to Dr. Susan Kutz in Saskatchewan for analyses. Low numbers of gastrointestinal nematodes were present. Protostrongylus species, most likely P. stilesi, were present. The dorsal-spined larvae differ from those recovered from Dall's sheep feces and their identity remains unknown. Larval counts of both species are relatively low and the significance to the health of the muskoxen is unknown. The finding of Protostrongylus species in muskoxen may represent the second report of P. stilesi in muskoxen. Blood serum will be analyzed for diseases.

➔ Population computer model

A computer stochastic population model was developed in Microsoft Excel to estimate at what size the population stabilizes and to determine the effect of different harvest regimes on the Yukon North Slope muskoxen population size and distribution. The model consists of 3 areas; the Core Area is between Alaska border and Shingle Point, and the Remote Area is outside the Core Area in Canada, broken into 2 areas (less than 100 miles and greater than 100 miles, Smith 1989). The starting population for the model is the July 1993 composition count data. The model calculates the population size after 25 years and runs the model 500 times. The final population size will graphed in a histogram as an index of probability of population change.

Partners / personnel	*Budget*
Aklavik Hunters and Trappers Committee Parks Canada	Funding was provided by IFA Implementation through Parks Canada and Government of Yukon IFA Wildlife Programs, as recommended by the Wildlife Management Advisory Council (North Slope).

Products / publications (if any)

Cooley, D., and I. McDonald. In prep. Yukon Muskox Population Studies, 1999 to 2001.

Project title	Status	Time frame
Richardson moose survey	Complete	2000

Rationale / management objective

We conducted a moose survey in the northern Richardson Mountains and adjacent Yukon Coastal Plain between March 21-24, 2000. This area was previously surveyed in March 1989 as part of a Wildlife Management Program under the Inuvialuit Final Agreement implementation. The report from that study summarized the results of a comprehensive study into the abundance, seasonal movement patterns, and habitat use of moose in the study area between 1987 and 1990. The report indicated that the moose population was vulnerable to over-harvest and potential oil and gas land development due to the clumped distribution of moose and the patchiness of suitable habitat. The report recommended periodic re-surveys of the area to monitor changes in moose abundance and assess the impact of harvest or land development on the moose population.

Project description

A Bell 206 Jet Ranger helicopter was used to re-survey the area that was surveyed in March 1989. We counted a total of 445 moose in the North Richardson Mountains survey area, which is an increase of 67% over the number of moose counted in the same area in March 1989. (Note that in 1989, a sightability correction factor of 1.07 was applied to the observed numbers to come up with a total population estimate of 283 moose for the area).

The number of moose observed in 2000 represents an overall density of about 48 moose per 1000 square kilometers (km^2) for the entire study area. If we consider only habitable moose range in the survey area (approximately 610 km^2, or 6.5% of the total survey area), the density is much higher, at about 730 moose per 1000 km^2. This is more than three times higher than the average density recorded in other areas surveyed throughout the Yukon to date. The highest densities recorded elsewhere in the Yukon have ranged between 500 and 600 moose per 1000 km^2.

A major die-off of moose of up to 75 to 90 percent of late 1980 population levels was observed on the Alaskan North Slope in the mid-1990's. The reason for the decline was not known, but there was a concern that a similar problem may exist in moose populations on the North Slope of the Yukon. Given the increase in moose abundance in the North Richardson Mountains study area between 1989 and 2000, the problem does not seem to be have occurred in this area.

Of the total moose observed in the area in 2000, 175 were mature cows, 174 were mature bulls (99 for every 100 mature cows), 74 were calves (40 per 100 mature cows) and 22 were adults that were not identified to sex (Table 1). Although the number of calves observed increased considerably between the two surveys (up 72% in 2000), the overall percentage of calves in the total population has remained about the same (around 16%). Nineteen percent of cows with calves had twins, which is similar to the 16% twinning rate observed during the 1989 survey. In general, at least 30 bulls and calves per 100 mature cows is considered sufficient to maintain a stable population. The healthy bull to mature cow ratio and relatively high calf recruitment rate observed in 2000 suggests that the population should continue to increase.

As in 1989, moose numbers were higher on the south slope (360 moose) than on the north slope (85 moose) of the Richardson Mountains survey area. A higher percentage of moose were observed on the North Slope this year (19%), however, than in 1989 (7%), and may be related to differences in late-winter conditions between the two survey years. It may also be a reflection of recent and continuing colonization of the north slope area. A few moose were also located in drainages in the eastern portion of the region that were not occupied during the last survey (e.g. East Bear Creek on the south slope, Little Fish Creek, Martin Creek and the Willow River on the north slope).

Prior to the 1989 survey, the annual reported moose harvest by Aklavik residents had declined from 14 to15 moose between 1987 and 1989 (a portion of which was outside the study area), to 3 to 7 moose per year between 1993 and 1995. The most current harvest rate of 8 and 6 moose per year by Aklavik residents was in 1996 and 1997 respectively, but no location data was available to determine if these were taken in or outside of the study area. Harvest data for 1998 and 1999 were not available, but local knowledge suggests that hunting pressure for moose has generally been low in the Aklavik area because people prefer to harvest caribou when both are available.

Given that the area moose population has increased considerably over the past decade and moose harvest has generally been declining since 1989, the current moose harvest by Aklavik residents is clearly within sustainable limits. If the Porcupine caribou herd continues to bypass the Aklavik area as they have in the past few years, however, the moose harvest may increase in the future. As discussed in the 1991 report, this population is particularly vulnerable to hunting and other human disturbance because moose are concentrated in narrow strips of habitat along river and creek valley bottoms. Over-harvest or disturbance of local habitat patches may, therefore, impact a relatively large segment of the population.

Products / publications (if any)

YTG File report

Partners / personnel	*Budget*
Aklavik Hunter's and Trappers Committee Parks Canada	$30,330.04

Project title	Status	Time frame
Porcupine Caribou studies	Ongoing	Ongoing

Rationale / management objective

Each year, numerous projects on Porcupine Caribou are done. All projects are cooperative with various agencies and organizations that have an interest in the herd. IFA implementation funds have been used for 3 projects: conventional collaring, satellite collaring and composition counts.

Each year, as radio-collared caribou die of natural causes, more caribou need to be collared in order to maintain the desired number of collars on the herd. The population decline has prompted biologists to increase the number of collars currently deployed and they would like to increase the number that put out each year to around 20. Co-operators purchase conventional radio collars and YTG deploys them on caribou.

There is a cooperative effort to maintain satellite collars on Porcupine caribou cows in order to document annual migration routes and winter range use. The Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service purchases satellite collars and YTG deploys them. Contributions from various organizations are sought to pay for satellite system fees and data retrieval. Annual documentation of range use is important. Analyses of conventional and satellite telemetry information shows a loose pattern of shifting winter range use over the years. Satellite collars seem to reflect the general distribution of the herd and have proved to be valuable in recording routes used and timing of the migrations.

The Government of Yukon conducts a composition count in March to estimate over-winter survival of calves. Because we locate the radio collared caribou during these counts, we also document late winter range use by the herd.

Project description

Radio collars are used for numerous projects with the herd. They are used to locate the herd for the March composition counts and for the July censuses. The collars have been crucial in documenting the importance of ANWR to calving caribou. In order to document the calving areas each year with confidence, a minimum of 50 (preferably 75, ideally 100) calving locations need to be mapped. The conventional radio collars, along with the satellite collars, are also used to document winter range use.

All the radio collars, conventional and satellite are used to locate the herd during the composition fieldwork. The current satellite collar project has a large public information component with maps faxed out weekly to about 26 interested agencies, a web site (www.taiga.net/satellite/index.html), and invitations for schools to use the data for projects with help from resource people from all co-operators. An internet based education program called Journey North started using the satellite locations during the spring of 2002 as one of their projects with students (www.learner.org\jnorth).

During the composition count, caribou are classified into sex and age categories (male calf, female calf, cow, immature bull and mature bull). The ratio of calves to cows is an index of calf survival from birth to 9 months of age.

Products / publications (if any)

YTG field reports

International Porcupine Caribou Management Board. 1993. Sensitive habitats of the Porcupine Caribou Herd. 28 pp.

Porcupine Caribou Management Board. 2003. Summer ecology of the Porcupine Caribou Herd. 14 pp.

2 websites: www.taiga.net/satellite/index.html and www.learner.org\jnorth

Partners / personnel	*Budget*
Alaska Dept of Fish and Game U.S. Fish and Wildlife Service (Arctic National Wildlife Refuge) Canadian Wildlife Service Ivvavik National Park Vuntut National Park	Total contributions for all projects approximately $94,000 IFA Implementation funds $29,750

Project title	Status	Time frame
Herschel Island ecological monitoring	Ongoing	1999 and on

Rationale / management objective

This is a cooperative project between 2 Government of Yukon branches, Herschel Island (Qikiqtaruk) Territorial Park and the Dawson office of the Regional Management section. The aim of the project is to develop and implement a long-term system to monitor a full range of ecological components on Herschel Island Territorial Park. This project builds on 14 years of data already collected by the Herschel Island Territorial Park Rangers. These data include wildlife sightings, and systematic surveys of black guillemots, breeding birds, and bird nests. Starting in 1999, various components were added to this existing monitoring regime. These are vegetation species abundance, biomass and phenology, ground and permafrost temperatures, and wildlife locations by vegetation and terrain units.

Project description

In 1999, the vegetation monitoring methods for Herschel Island were initially modeled using the ITEX (International Tundra Experiment) protocols. ITEX was formed in 1990 to provide researchers with standard procedures to document the effect of predicted climate change on plants throughout the arctic. As of January 2000, there are 16 active ITEX sites in the circumpolar north.

There is a permanent plot in each of 2 vegetation communities to document the species composition and biomass (types of plants present and how big they are). These plots were set up in 1999 and will be re-measured every 3 to 5 years. The Cottongrass / Moss community is the type that resembles Porcupine Caribou calving habitat. The second vegetation type is an Arctic Willow / Dryas-Vetch community. This vegetation type covers approximately 40% of the island and is the community that increases in grass, *Arctagrostis latifolia*, and willows were first documented since the original fieldwork in 1985.

There are 3 phenology transects that record timing of growth or life history stages of plants. The transects will help us understand how annual variations in climate may affect the timing and amount of plant development. Plants being monitored by the Herschel Island Rangers are Arctic willow, Mountain Avens, and Cottongrass. Various measurements for each plant species are recorded, such as date of first flowering, the amount of new growth that year, and date when flowers go to seed.

The active layer and near-surface permafrost temperatures are recorded using automatic dataloggers. The dataloggers are programmed to record the temperature in 6 hour intervals at 20, 50, 100, and 150 cm depths. These dataloggers are installed at the 2 permanent vegetation plots. A 15 meter thermistor has been installed. These readings are recorded at least twice each year in July by the Herschel Island Rangers and again in March by Parks Canada or YTG field biologists. This probe is installed near the permanent vegetation plots.

Rangers have been recording sightings of all wildlife since 1988. They have recorded over 90 species of birds, 21 species of mammals and 4 species of sea mammals. The current sightings reporting system includes recording the vegetation and terrain type where a terrestrial animal is

seen. This should allow us to document the relative importance of the different vegetation communities to various species of wildlife which use the island.

In addition to wildlife sightings, Rangers continue to conduct projects started in the early 1990's. Three Breeding bird transects close to Pauline Cove have been surveyed every year since 1990. Ninety-four of the 276 bird species observed in the Yukon have been seen on Herschel Island. Through these transects and other work, breeding has been confirmed for 40 of these species to date. Rangers have also recorded all bird nest sites in the area of the Settlement since 1990. Herschel Island is home to the largest colony of Black Guillemots in the western arctic. Rangers first counted these birds in 1988, and have done annual surveys since 1992. Information includes the number of nest sites occupied, egg production and number of chicks hatched.

Snow depth is recorded at 6 spots across the Yukon North Slope, including Herschel Island to document patterns in snow accumulation. Snow depth has been measured in mid to late March each year since 1999 by YTG or Parks Canada field biologists.

Products / publications

CANTTEX web site (www.taiga.net/canttex/index.html).

Herschel Island Ecological Monitoring. Instruction Manual for the Herschel Island Territorial Park Rangers. Last updated 2002.

Kennedy, C, S. Smith, D. Cooley, S. Kokelj and C. Burn 2000. Environmental monitoring on Herschel Island, Yukon. in Program and Abstracts, 51st Arctic Science Conference, September 2000, Whitehorse, YT. p 165.

Kennedy, C.E., Smith, C.A.S. and Cooley, D.A. 2001. Observations of change in the cover of Polargrass, *Arctagrostis latifolia*, and Arctic Lupine, *Lupinus arcticus*, in upland tundra on Herschel Island, Yukon Territory. Canadian Field-Naturalist 115(2): 323-328.

Partners / personnel	*Budget*
Herschel Island Rangers, Jill Johnstone (botanist, currently at UAF), Bill Cody (botanist in Ontario), Chris Burn (permafrost specialist at Carleton University), Steve Kokelj (PhD candidate at Carleton University), Scott Smith (Soil specialist with Agri-food Canada), Catherine Kennedy (Habitat specialist with YTG).	The project has been funded by the Inuvialuit Final Agreement under funds provided to the Government of Yukon (IFA Wildlife Programs and Herschel Island Territorial Park). Annual IFA Implementation funds approximately $28,000 over 6 years.

Project title	*Status*	*Time frame*
Aklavik harvest data collection	Ongoing	2001 and on

Rationale / management objective

The Inuvialuit Harvest Study (IHS) is no longer operating. Harvest reporting for some species is done using other means (furbearer seals, mandatory reporting for species under quota etc). However, there is no mechanism in place to regularly record the harvest of the moose, caribou or sheep.

Project description

In 2001, YTG developed a database and summarized 12 years of harvest data for the Yukon collected during the IHS. The current database includes data collected for 1987 to 2002, except 1999.

YTG contracts a local person in partnership with the HTC to conduct recall interviews twice each year during freeze up and break up in Aklavik. Inuvialuit hunters are questioned on their harvest of moose, caribou and sheep in the Yukon and NWT. Information recorded includes species, kill date, kill location by Game Management Subzone (GMS), sex and maturity of kill, hunter name, hunter's home community. All identifying information will be confidential however summary information on total harvest by GMS can be made public. Information collected is added to the database of harvest information from the Inuvialuit Harvest Study.

Products / publications (if any)

Internal database of harvest data

Partners / personnel	*Budget*
Aklavik Hunters and Trappers Committee	$3,000 per year IFA implementation funds