THE SEASONAL DISTRIBUTION AND HERD DELIMITATION OF NORTHEASTERN MAINLAND CARIBOU (*Rangifer tarandus groenlandicus*)

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STATUS REPORT TO THE NUNAVUT WILFLIFE MANAGEMENT BOARD
(NWMB Project #5110-04-2)

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January 15th, 2005

Title: The seasonal distribution and herd delimitation of Northeastern Mainland caribou (*Rangifer tarandus* groenlandicus).

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Report Summary:

2004

The final calving ground delineation survey of the study was flown over the Wager study area with Laurent Kringayark & Jonathon Pameolik observing. Flights were based out of Repulse Bay and covered the same transects flown during the last two calving delineation surveys. Observations of caribou made during this survey were similar to those made in June 2002. Though the survey was designed specifically to chart calving caribou distributions and not to estimate population an estimate was made, and between 22,167 and 34,091 adult caribou were observed. These figures should be used with caution when being incorporated into Management decisions.

Over the 2004 season Wager caribou generally moved off Melville Penninsula into the Armit Lake and Baker Lake areas with the exception of the three collars occupying the Douglas Harbour area. These three collars represent +/- 1000 animals that spend their entire year on the north shore of Wager Bay moving more specifically to the Douglas harbour area over the spring (calving) summer and fall seasons. Recent information marks the 2004/05 season as the first winter these Wager collared cows have moved from the area towards the Baker Lake area in the southwest. Sever icing in November of 2004 and/or the low productivity of the 2004 growing season are just

two possible explanations. These same extensive westward movements were also observed on the Lorillard Range where only animal remained by December 2004.

The study will now wrap up with the collection of dropped satellite collars in April 2005 for the Lorillard Herd and again in April 2006 for the Wager Herd.

Introduction:

Repulse Bay, Baker Lake, Chesterfield Inlet, Pelly Bay and Igloolik have reported general declines in Northeastern mainland caribou health and numbers. With little information available on the number and size of caribou populations within the Northeastern mainland region, their range requirements and seasonal range use, managers have been unable to address community concerns. Surveys flown between 1976 and 1987 found three distinct densities and associated calving grounds occupying the Northeast mainland of the Kivalliq Region in June; the Melville, Wager, and Lorillard Herds (Calef and Helmer, 1976; Calef and Heard, 1981; Heard et al., 1981; Heard et al, 1987; Donaldson, 1981). More recently a VHF collaring program deployed within the Wager and Lorillard ranges, has suggested the presence of at least three additional populations displaying calving ground fidelity (Heard et al., 1986). Further surveys to confirm these apparent populations as distinct herds with associated calving and rutting grounds have yet to be conducted. Of these surveys only one, flown in 1983, has examined the entire Northeastern Mainland Region producing an estimate of 119,800 +/- 13,900 caribou (Heard et al., 1987). The 1983 survey also identified a fourth area with high caribou densities south of the Queen Maud Gulf. A follow up survey in this area in 1986 (Gunn and Lambert in prep.) found a discrete calving ground utilized by approximately 40,000 animals. This fourth population is now considered the Ahiak heard. The most recent population estimate of Northeastern mainland caribou was made in May 1995. The survey results suggested that caribou numbers had dropped significantly from 119,800 +/- 13,900 animals in 1983 to 73,994 +/- 11,670 caribou in 1995. On Melville Peninsula caribou had all but disappeared and had significantly declined north of Wager Bay. Reasons for this 84 % decline in caribou are unknown, as are the populations or population it effected.

A series of 15 traditional knowledge interviews, focusing on aspects of NEM caribou ecology, have taken place in Baker Lake, Chesterfield Inlet and Repulse bay. The results of this study are currently being integrated with ongoing research. This ongoing research is addressing critical knowledge gaps as well as increasing our knowledge of barren-ground caribou range and population ecology. Filling knowledge gaps concerning Northeastern mainland caribou range use, critical range identification, herd identification and status, and major shifts in range use, remains a Regional priority.

Project Start:

The study of Northeast Mainland Caribou through the use of satellite telemetry and periodic calving ground delineation's began April 15th, 1999. From mid to late April 1999 ten ST-14 satellite collars were systematically placed on 10 barren-ground caribou cows occupying an area between the north shore of Chesterfield Inlet and the south shore of Wager Bay (Lorillard Population) and the following year on caribou cows occupying an area between the north shore of Wager Bay and the southern tip of Committee Bay and the northern tip of Repulse Bay (Wager Population). Calving ground delineations were then flown, using caribou cow satellite collar locations to guide survey effort, within each of these areas between June 8th and 15th, 1999, 2000, 2001, 2002 and 2003.

Project Finish:

The expected date of completion for the Lorillard field component of the Northeast Mainland research program is April 15th, 2005 and for the Wager field component April 15th, 2006. The project is currently on schedule, completing the 2004 field season on June 15th, 2004. The project will culminate with the collection of Liorllard collars April 2005 and Wager collars April 2006. A final report is scheduled to be completed March 2007.

Objectives:

The objectives of the project follow: a) to utilize satellite telemetry and calving ground delineation's to determine the range and number of distinct populations occupying the Northeast mainland. Collars will be systematically deployed over the study area during early spring, a time of year, other then calving, when the expression of herd fidelity is at it's strongest. b) To utilize satellite telemetry to address the land use management issue of important winter, spring, summer and fall range. This base-line information is essential for determining where, when, and how natural resource industries can become established without jeopardizing the conservation of northeastern mainland caribou or their range. The following is a breakdown of the objectives above into specific questions and their biological rationale:

1)   Are Northeastern Mainland caribou aggregated into distinct populations?
Biological rationale: Caribou herds are largely identified through their use of common calving and to a lesser extent, rutting grounds. Satellite collars will be used to track movement onto calving and rutting grounds. Calving ground delineations will be flown every second year to determine caribou densities and extents. Examining whether the same collared females are utilizing the same calving and rutting grounds will help us identify populations.

2a)   What seasonal movements and large-scale geographical shifts in range do Northeastern mainland caribou populations under take?
Biological rationale: Monitoring collared females over the long term will help us understand range size and importance. Caribou are extensive not intensive feeders

and through time environmental and/or biological conditions require animals to either seek new range or expand existing range. These changes, although infrequent, will provide an indicy of that population's (Identified in objective 2) range requirements and fidelity to that range and components therein.

2b) Locate and quantify the seasonally important components of Northeast Mainland caribou range using satellite telemetry.
Biological rationale: Habitat quality, quantity and availability largely define the biological limitations of wild populations (Gray and Donihee, 1983; Scotter, 1980; Thompson et al, 1980; Dasmann, 1981). An understanding of the locations and size of distinct vegetation classes and how these classes relate to Northeast Mainland caribou habitat requirements assist managers in assessing the population's present and future needs. A determination of the seasonally important components of Northeast Mainland range will largely rely on the integration of the location and activity database with a vegetation database utilizing spatial analysis software (See the proposal "Vegetation mapping in the Kivalliq Region using digital Landsat TM data"). In addition to satellite telemetry data the analysis would also integrate components of traditional knowledge, classification and composition locations, aerial survey locations, sighting locations and habitat studies published in refereed journals. The classification of Northeast Mainland range today will also allow for comparative studies into the future. A satellite telemetry program offers the most cost effective and logistically simple means of identifying and monitoring caribou range use.

Methods:

The delineation of the Wager calving grounds continued June 12, 2004 on the original 24 month rotation using the fixed line transect survey method. The calving ground survey was flown using a Cessna grand caravan high wing aircraft based out of Repulse Bay. Strip widths were established using streamers attached to the wing struts (Figure 1). Strip width (w) was calculated using the formula of Norton-Griffiths (1978):

$$w = W * h/H$$

Where:

W = the required strip width;
h = the height of the observer's eye from the tarmac; and
H = the required flying height

Strip width calculations were confirmed by flying perpendicularly over runway distance markers periodically throughout the survey. The strip width area for density calculations was 1000 m out each side of the aircraft, for a total of 2000 m along each transect. To facilitate distance-sampling techniques, strips were subdivided into seven 250 m sections (0–250 m; 251–500 m…1750–2000 m). Distance sampling is not used

specifically in this report, but the data will be available in that format for future applications and final reports.
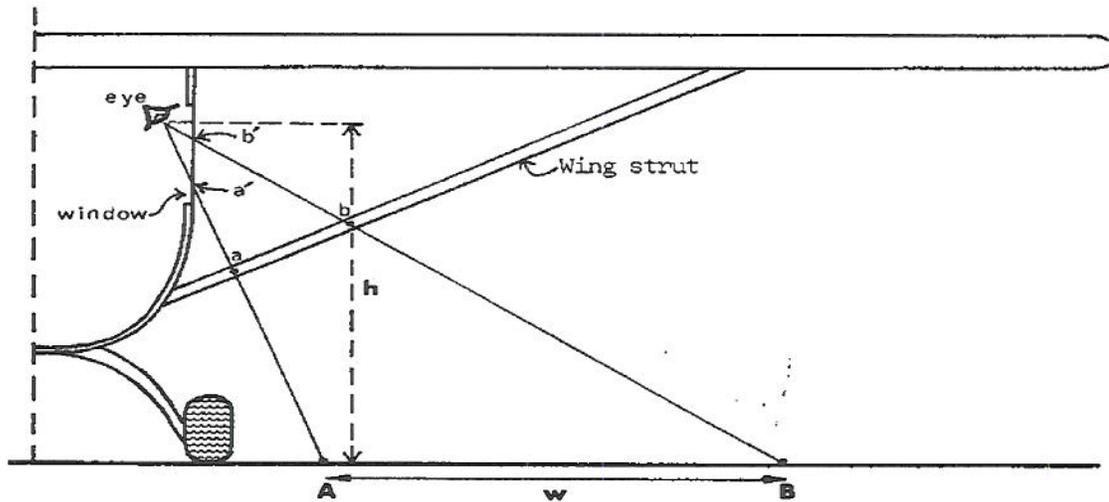

Figure 1. Schematic diagram of aircraft configuration for strip width sampling (Norton-Griffiths, 1978). W is marked out on the tarmac, and the two lines of sight a' – a – A and b' – b – B established. Streamers are attached to the struts at a and b. a' and b' are the window marks.

All northeast mainland surveys followed transects set out during the 1999 and 2000 reconnaissance and calving ground surveys. The replication of past survey methodologies will allow for the determination of population and/or distribution changes between surveys for both groups of caribou and other wildlife observed along identical transects.

Deliverables:

1) Annual progress reports and a bi-annual newsletter to DoE HQ, contributing agencies, community HTOs and co-managers.
2) DoE file report, currently in production, with expectations of completion of all phases by March 2007.
3) Published scientific papers in refereed journals following the release of the file report.
4) Community seminars and/or radio shows describing methods and benefits of research and to obtain recommendations and/or address concerns thereof.
5) Ultimately, conclusions drawn from this study will be used to address Northeast mainland caribou harvesting and land use issues as well as circumpolar barren-ground caribou management issues.
6) The generation of 20 person days of employment to local peoples.

Results:

Lorillard Calving

On the Lorillard Range two regions, one in the northern and one in the southeastern corner of the study area, have shown relatively high densities of calves in each of June 1999, 2001 & 2003 (Figure 3+4). An additional calving area was apparent north of Wager Bay in 1999. Although Lorillard satellite collared cows were not in this area June 2000, 2001, 2002 or 2003, Wager satellite collared cows with calves were. In June 2001 the calving area at the headwaters of the Lorillard River just south of Wager Bay shifted approximately 20 Kilometers to the west compared to the 1999 calving ground survey. In 2003 the calving grounds were again in the same general area but slightly south of 1999 and 2001 survey findings. In addition the 2001 survey showed an increase in the number of adults on the calving grounds (Table 1 & 2)(Figure 2) when compared to the 1999 and 2003 results. A population estimate using the June 1999 survey data found 13,918 +/- 5,377 adult caribou (95% confidence limits) on the calving ground. Identical surveys (using the same transects flown in 1999) flown in June 2001 and 2003 found 34,520 +/- 17,977 (95% confidence limits) and 12,156 +/- 3,697 (95% confidence limits) adult caribou respectively. Though the coefficient of variations for the 1999 and 2001 surveys were very high (1999 = .39, 2001 = .52) the data was tested to determine the significance of the change using equation 5.3 of Thompson et al. (1998):

$$z = \frac{Y_{1999} - Y_{2001}}{\sqrt{Var(Y_{1999}) + Var(Y_{2001})}}$$

where:

z = z statistic;
Yx = population estimate for year x
$Var(Yx)$ = variance of the population estimate.

There was a significant increase in the number of adult caribou on the calving grounds between June 1999 (Y = 13918) and June 2001 (Y = 34520)(z = 2.34, P = 0.02). The underlying reasons for this increase over such a short period of time may be related, in part, to the movement of Lorillard animals out of the June 1999 calving ground survey area prior to the survey and/or the movement of Wager caribou south of Wager Bay and into the Lorillard River area in 2000. This movement was documented using the location data of ST-14 satellite collars, which indicated 7 of the 10 satellite collared Wager cows made this journey of which only 6 retuned north of Wager Bay by June 2001. The 2003 survey results in comparison to the 1999 and 2001 surveys were relatively precise with a coefficient of variation of 0.15. There was no significant difference between the 1999 and 2003 results and a significant difference between the 2001 and 2003 results. These findings are consistent with the initial hypothesis that Wager animals moved into the Lorillard study area over the 2001 survey period and moved back to the Wager study area prior to the 2003 survey. Following the 2001 survey Wager collars once again moved out of the Lorillard study area and the
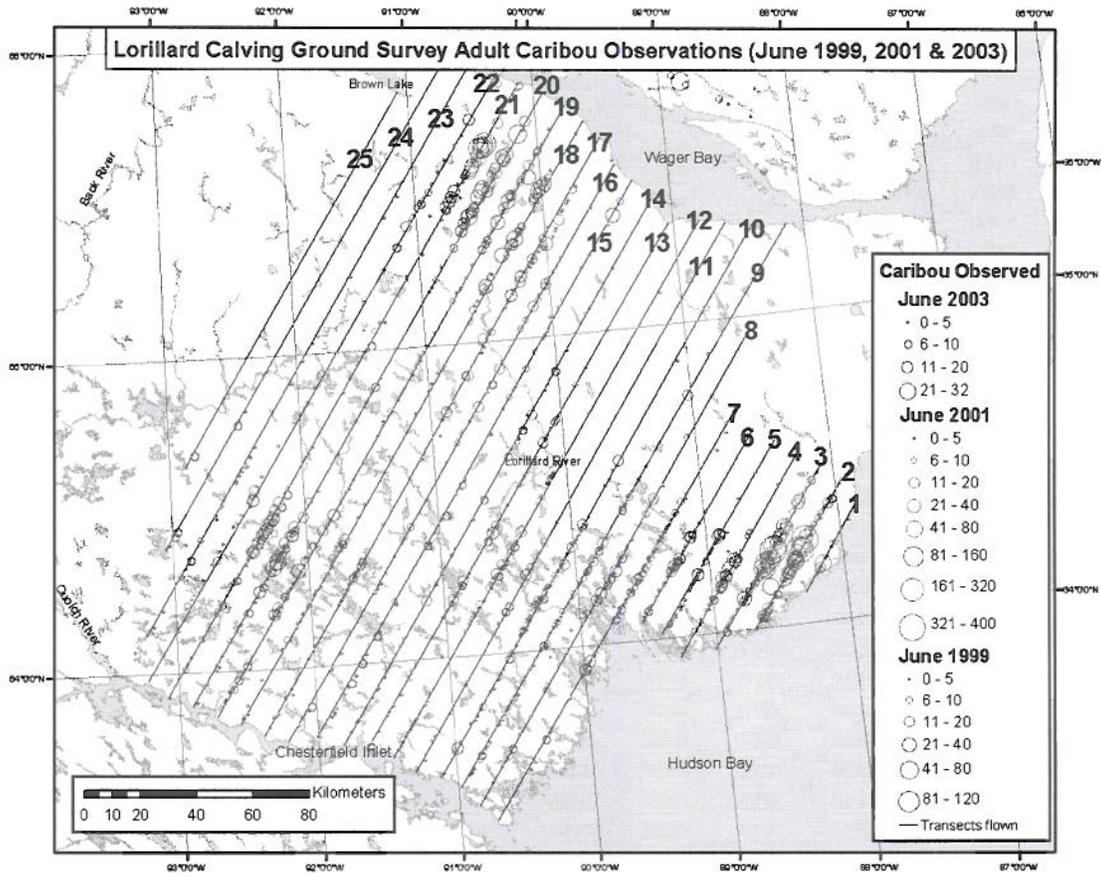
Figure 3   The distribution of adults on the Lorillard range as recorded from aerial surveys flown over the area in June 1999, 2001 & 2003.
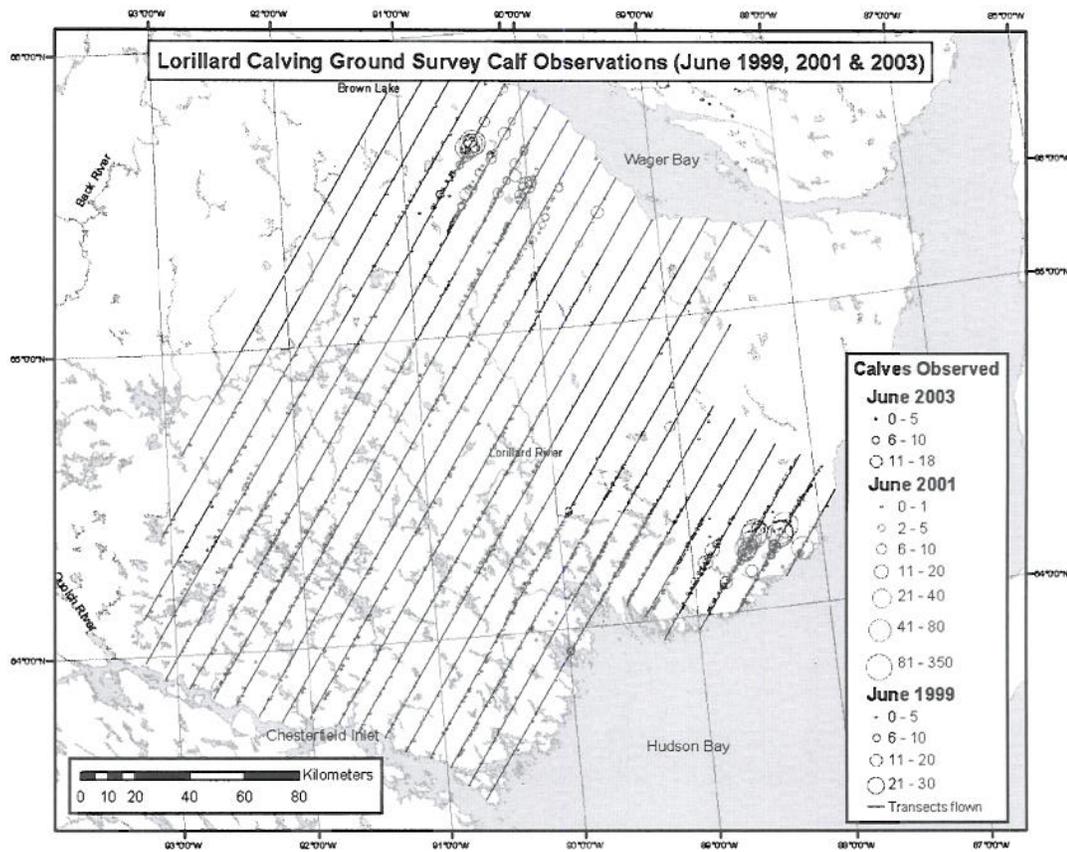
Figure 4   The distribution of calves on the Lorillard range as recorded from aerial surveys flown over the area in June 1999, 2001 & 2003.

Table 1   A population estimate of the Lorillard calving ground study area
           comparing June 1999, 2001 and 2003 results. All transects flown in all
           years were identical to those flown in June 1999.

| HERD | Lorillard | Lorillard | Lorillard |
YEAR	1999	2001	2003
Y = R x Z	13917.77554	34520.27285	12155.71985
Var(Y)	6367549.315	71166719.52	3367045.575
SE(Y)	2523.400348	8436.036956	1834.95111
95% Confidence Limits of Y (+/-)	5377.366141	17977.19475	3697.426486
95% Confidence Limits of Y (%)	38.63667814	52.07720933	30.41717422
Coefficient of Variation	0.386366781	0.520772093	0.150953718

Table 2   Transect observations from the June 1999, 2001 and 2003 calving
           ground surveys. All surveys flew identical transects to the June 1999
           survey.

Transect #	LENGTH (km)	WIDTH (km)	AREA (km^2) = (z)	Adults (1999)	Adults (2001)	Adults (2003)
1	36.477	2	72.954	15	109	7
2	60.743	2	121.486	10	1042	171
3	74.088	2	148.176	396	1194	38
4	78.783	2	157.566	16	193	110
5	79.18	2	158.36	21	76	72
6	79.839	2	159.678	39	49	106
7	134.361	2	268.722	84	119	98
8	189.469	2	378.938	72	65	90
9	235.408	2	470.816	77	150	42
10	230.976	2	461.952	132	122	53
11	225.931	2	451.862	57	0	15
12	223.01	2	446.02	38	143	21
13	218.696	2	437.392	41	89	56
14	225.99	2	451.98	3	91	57
15	231.362	2	462.724	80	86	50
16	240.674	2	481.348	46	133	28
17	246.617	2	493.234	104	192	80
18	248.934	2	497.868	335	56	107
19	252.184	2	504.368	221	155	137
20	254.968	2	509.936	319	244	305
21	253.85	2	507.7	125	1076	211
22	251.519	2	503.038	28	152	54
23	234.814	2	469.628	0	67	32
24	199.598	2	399.196	0	0	27
25	156.032	2	312.064	0	0	6

correlated drop in caribou numbers seemed to be the result. Movements of Lorillard cows into the Wager study area are unclear at present. The analysis will continue until the project's expected completion in December 2006.

Wager Calving

On the Wager range the June 2000 survey identified approximately 5 calving aggregations. The first and largest of these aggregations was located along the eastern coast of Mellvile Peninsula from Cape Penrhyn south to the mouth of Lyon Inlet, the second aggregation was on a 10-15 Km stretch of beach adjacent to Wales Island along the Western coast of Melville Peninsula while a third grouping was observed along the North shore of Lyon Inlet. Two smaller calving aggregations were located south of Repulse Bay, one along the Snowbank River and the other along the Piksimanik River in the vicinity of the North shore of Wager Bay (Figure 5 +6).

The June 2002 survey once again found adults and calves spread fairly evenly throughout the survey area. There were concentrations of calves found in sites common to both the 2000 and 2002 calving surveys. These common sites include the north shore of Wager Bay in the vicinity of the Piksimanik River, the south shore of Repulse Bay in the vicinity of Panalik and Beach points, and the north and south shores of Lyon Inlet west to Norman Inlet. Calving areas observed in June 2000 but not in 2002 include the west shore of Melville Peninsula adjacent to Whales Island, an area south of Whales Island extending east along the Matheson River, and an area along the east coast of Melville Peninsula in the vicinity of the Barrow River. The late arrival of spring across the Kivalliq may explain the low number of calves observed within the northern reaches of the survey area though the number of adult caribou seemed to have increased since the 2000 survey. In fact snow cover values recorded in June 2002 were higher than those recorded within the same areas in 2000 particularly in the north, from Whales Island across to the mouth of the Barrow River.

A population estimate using the June 2000 survey data found 13095 +/- 3532 adult caribou (95% confidence limits) on the calving ground (Table 5 + 6). An identical survey (using the same transects flown in 2000) flown in June 2002 found 20931 +/- 5296 adult caribou within the same study area. Though the coefficient of variation for both surveys was high (2000 = .27, 2002 = .25) the data was tested to determine the significance of the change using equation 5.3 of Thompson et al. (1998):

$$z = \frac{Y_{1999} - Y_{2001}}{\sqrt{Var(Y_{1999}) + Var(Y_{2001})}}$$

where:

z = z statistic;
Yx = population estimate for year x
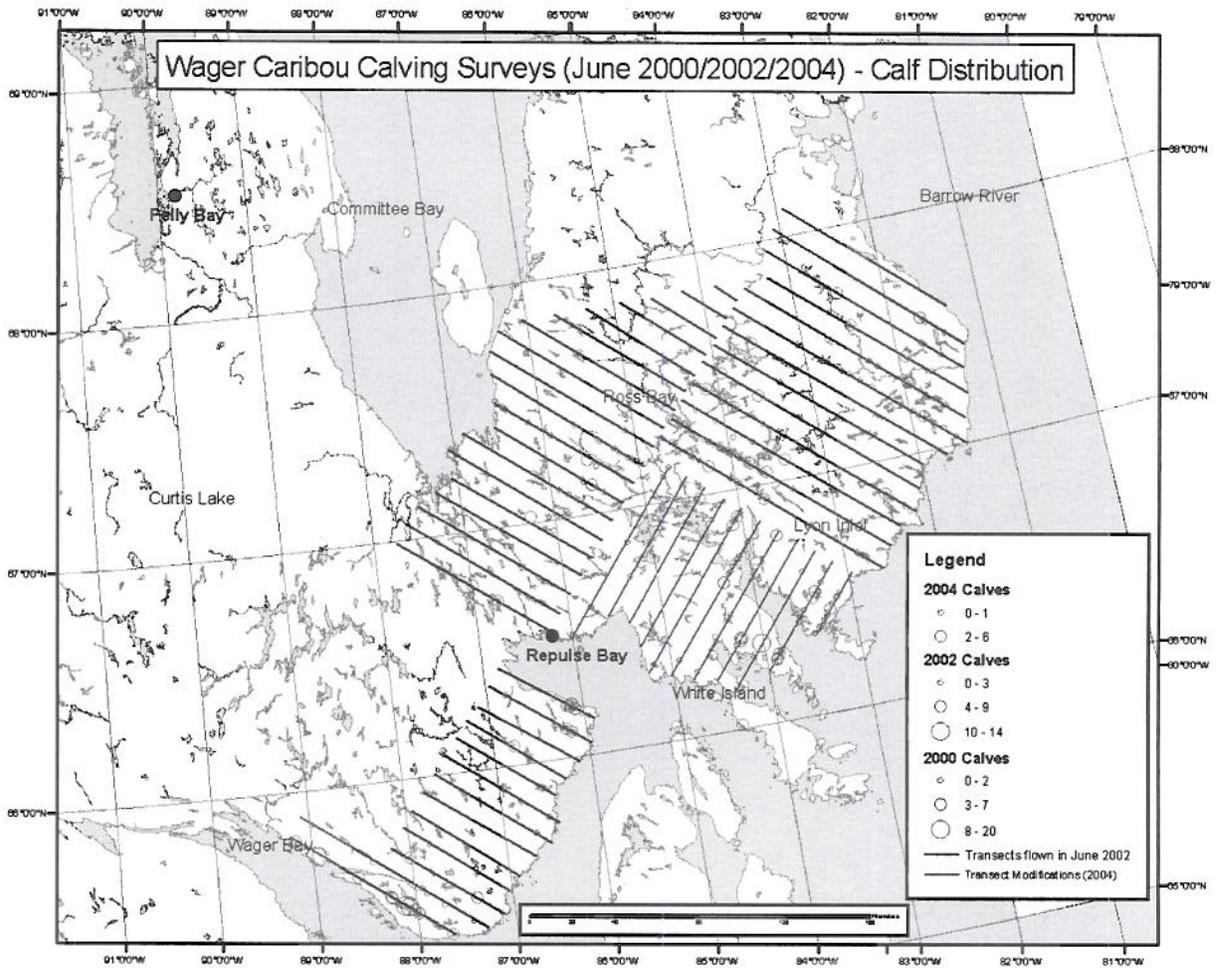$Var(Yx)$ = variance of the population estimate.

Figure 5   The distribution of calves on the Wager range as recorded from aerial surveys flown over the area in June 2000, 2002 and 2004.
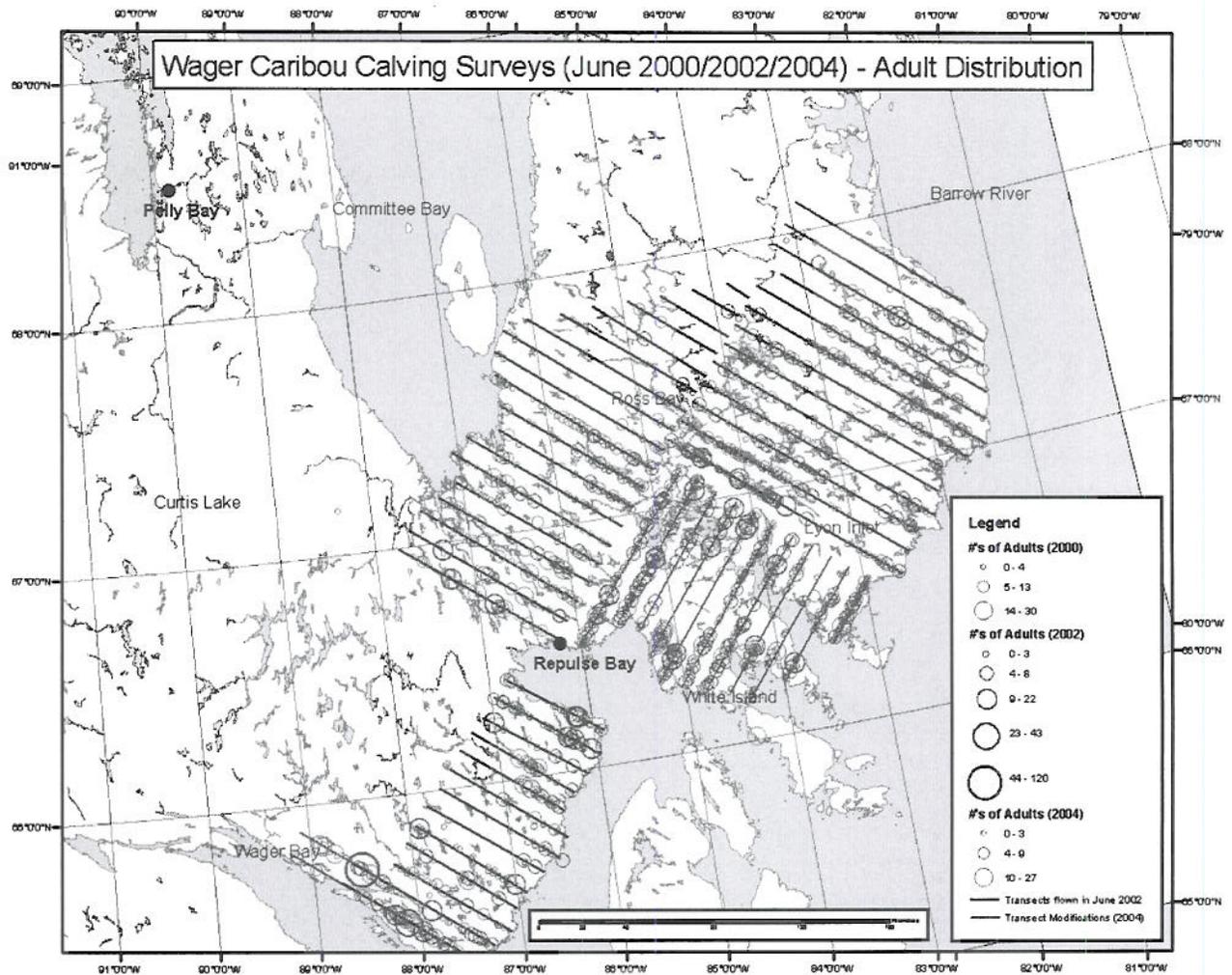
Figure 6.   The distribution of adults on the Wager range as recorded from aerial surveys flown over the area in June 2000, 2002 and 2004.

There was a significant increase in the number of adult caribou on the calving grounds between June 2000 ($Y = 13095$) and June 2002 ($Y = 20931$)($z = 2.62$, $P = 0.01$) and no significant difference detected between the 2002 and 2004 estimates (Table 3 and 4). There was a significant increase in the number of adult caribou on the Lorillard calving grounds between June 1999 ($Y = 13918$) and June 2001 ($Y = 34520$)($z = 2.34$, $P = 0.02$). The underlying reasons for this increase over such a short period of time may be related, in part, to the movement of Lorillard animals out of the June 1999 calving ground survey area prior to the survey and/or the movement of Wager caribou south of Wager Bay and into the Lorillard River area in 2000. This movement was documented using the location data of ST-14 satellite collars, which indicated 7 of the 10 satellite collared Wager cows made this journey of which only 6 retuned north of Wager Bay by June 2001. The 2003 survey results in comparison to the 1999 and 2001 surveys were relatively precise with a coefficient of variation of 0.15. There was no significant difference between the 1999 and 2003 results and a significant difference between the 2001 and 2003 results. These findings are consistent with the initial hypothesis that Wager animals moved into the Lorillard study area over the 2001 survey period and moved back to the Wager study area prior to the 2003 survey. The underlying reasons for this increase may be related, in part, to the movement of Lorillard animals into the Wager Bay area which may account for the lower numbers observed on the Lorillard range in April 2002 (Figure 7). Such a movement was not apparent when examining locations of collared animals.

Table 3   Population estimates of the Wager and Lorillard calving grounds. Surveys were flown between June 12th and 20th 1999 through 2004. Transects flown in each of the Lorillard and Wager study areas were identical between years.

HERD	Lorillard	Wager	Lorillard	Wager	Lorillard	Wager
YEAR	1999.00	2000.00	2001.00	2002.00	2003.00	2004.00
Y = R x Z	13917.78	13095.94	34520.27	20931.87	12155.72	28128.73
Var(Y)	6367549.31	2747421.65	71166719.52	6177744.81	3367045.57	7827422.41
SE(Y)	2523.40	1657.53	8436.04	2485.51	1834.95	2797.75
95% Con. Limits of Y (+/-)	5377.37	3532.21	17977.19	5296.62	3697.43	5962.01
95% Con. Limits of Y (%)	38.64	26.97	52.08	25.30	30.42	21.20
Coefficient of Variation	0.39	0.27	0.52	0.25	0.15	0.21

Table 4   Transect observations from the June 2000, 2002 and 2004 calving ground surveys. The June 2002 and 2004 surveys flew identical transects to the June 2000 survey.

Transect #	LENGTH (km)	WIDTH (km)	AREA(km^2) = (z)	ADULTS (2000)	ADULTS (2002)	ADULTS (2004)
1	84.389	2	168.778	7	32	100
2	84.389	2	168.778	13	33	22
3	84.389	2	168.778	11	1	98
4	78.760	2	157.520	14	16	125
5	75.927	2	151.854	2	10	51
6	84.561	2	169.122	1	24	69
7	81.527	2	163.054	14	8	32
8	70.333	2	140.666	24	18	36
9	74.667	2	149.334	47	18	28
10	82.661	2	165.322	17	30	132
11	89.787	2	179.574	7	6	21
12	91.546	2	183.092	4	3	15
13	92.851	2	185.702	23	5	6
14	94.651	2	189.302	4	12	5
15	61.220	2	122.440	2	4	0
16	48.585	2	97.170	0	0	11
17	36.051	2	72.102	0	3	0
18	24.796	2	49.592	0	5	0
19	13.199	2	26.398	0	0	0
20	41.706	2	83.412	16	10	7
21	69.894	2	139.788	46	7	17
22	87.348	2	174.696	18	54	18
23	107.367	2	214.734	20	43	21
24	118.918	2	237.836	72	47	45
25	125.984	2	251.968	86	44	92
26	120.990	2	241.980	35	38	72
27	113.677	2	227.354	31	27	41
28	118.147	2	236.294	9	19	27
29	122.169	2	244.338	27	50	96
30	119.080	2	238.160	25	102	66
31	119.906	2	239.812	26	51	152
32	122.028	2	244.056	75	153	88
33	34.166	2	68.332	85	41	56
34	58.620	2	117.240	41	44	40
35	74.919	2	149.838	39	14	34
36	74.748	2	149.496	27	33	61
37	79.626	2	159.252	64	83	69
38	83.850	2	167.700	69	59	84
39	88.053	2	176.106	17	77	82
40	79.813	2	159.626	38	60	83
41	72.707	2	145.414	11	51	37
42	74.838	2	149.676	42	129	96
43	90.689	2	181.378	30	111	162
44	52.259	2	104.518	42	77	26
45	55.848	2	111.696	71	117	20
46	56.241	2	112.482	0	35	11
47	54.936	2	109.872	3	22	56
48	55.404	2	110.808	0	29	95
49	62.662	2	125.324	5	8	8
50	63.942	2	127.884	0	19	5
51	61.956	2	123.912	0	12	0
52	59.406	2	118.812	0	31	29
53	59.270	2	118.540	2	16	29
54	62.007	2	124.014	0	7	42
55	59.003	2	118.006	10	57	109
56	47.678	2	95.356	60	124	134

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Lorillard and Wager Caribou Calving Ground Survey Results
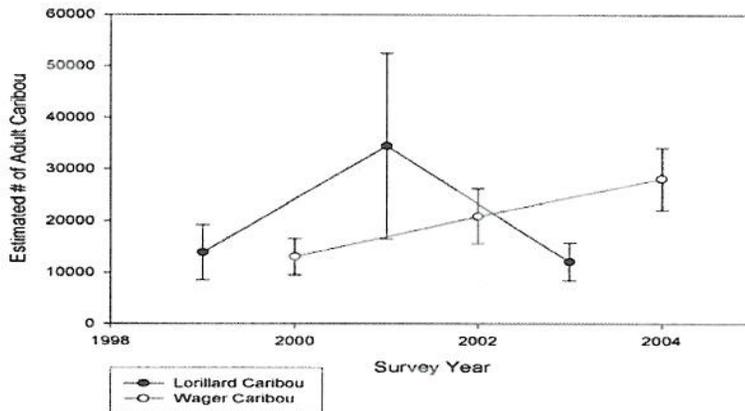**June 1999 to 2004**

Figure 7   Tracking the Lorillard and Wager populations during the calving season.

Management Implications:

To date the Northeast Mainland study has provided preliminary information on the numbers of caribou occupying the Northeast Mainland. This density-based information can be used to make recommendations concerning commercial allocations within the Lorillard and Wager populations as well as the estimating TAH (Total Allowable Harvest). In addition, the movement and survey data have provided valuable information concerning seasonal movements and range use. This preliminary information has identified annual calving grounds, spring and fall migration corridors and wintering grounds shared by both the Lorillard and Wager populations of caribou. Though continued monitoring is necessary to fill in the information gaps that still exist concerning these populations, the information collected thus far can and is being used to assess land use issues and mitigate their impacts.

Schedule:

Dropped Lorillard collars will be collected using Helocopter and if necessary, fixed wing aircraft on or about mid-April 2005/06. The collection of these collars in April 2006 will represent the completion of the study.

Distribution and Movements:

Both the Lorillard (Figure 8) and Wager (Figure 9) collared caribou cows showed more extensive westward movements in December 2004 then in previous years. In addition by December 2004 most Lorillard and Wager collared cows had moved north and west of Baker Lake sharing the same general areas. Calving in 2004 saw a continued movement of three Wager cows onto Boothia Peninsula while Lorillard cows remained within previously documented calving areas. The reasons for these extensive westward (Lorillard) and south-westward (Wager) movements could be related to an icing event that occurred along the Hudson Bay Coast as far north as Repulse Bay. The event occurred in mid-November when snow cover was already established north of Chesterfield inlet. This ice layer this weather system produced was reported as being up to two inches thick in some areas reducing the adherence of snow over extensive areas. These early winter movements could also be related to the short growing season observed last summer potentially causing all Kivalliq ungulates to seek higher quantities and qualities of forage extant to their currently defined winter ranges. Analysis of the 2004 movements and the possible reasons behind them is ongoing.

Personnel:

Mitch Campbell, Regional Wildlife Biologist, DSD, Arviat, NU.
- project design and implementation

Jonathon Pameolik, Regional Wildlife Technician, DSD, Arviat, NU.
- coordinator of project logistics

Local contractors , Chesterfield Inlet, Repulse Bay.
- Fuel caching, logistic support, survey observers.

Partners:

The seasonal distribution and herd delimitation of Northeastern Mainland caribou (*Rangifer tarandus* groenlandicus) is a cooperative research effort between the Department of Sustainable Development, the Nunavut Wildlife Management Board with support from Heritage Parks Canada during phase one. The project is strongly supported by the Baker Lake, Chesterfield Inlet and Repulse Bay HTOs and by the Kivalliq Wildlife Board.
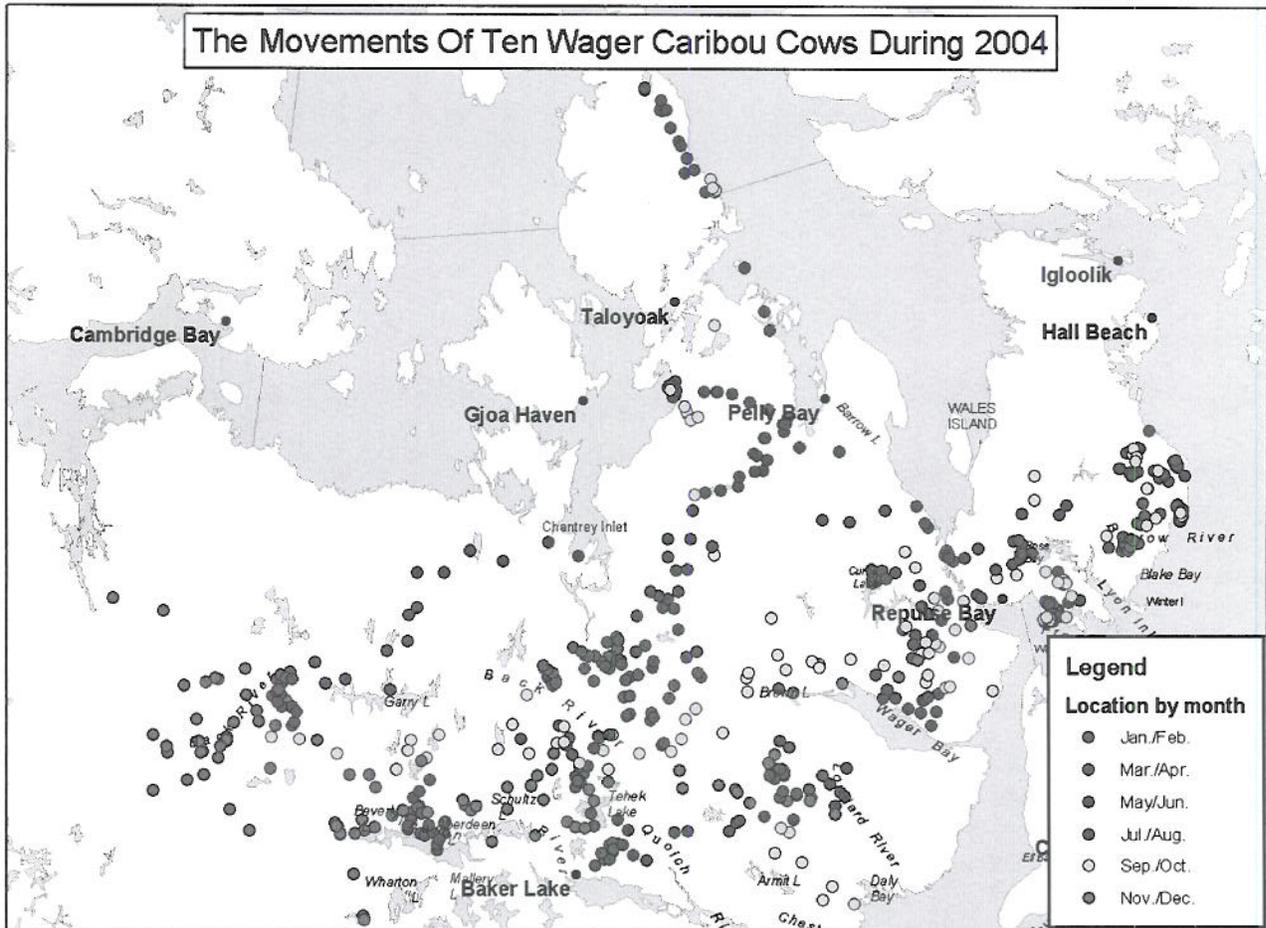
Reporting to Communities/Resource Users:

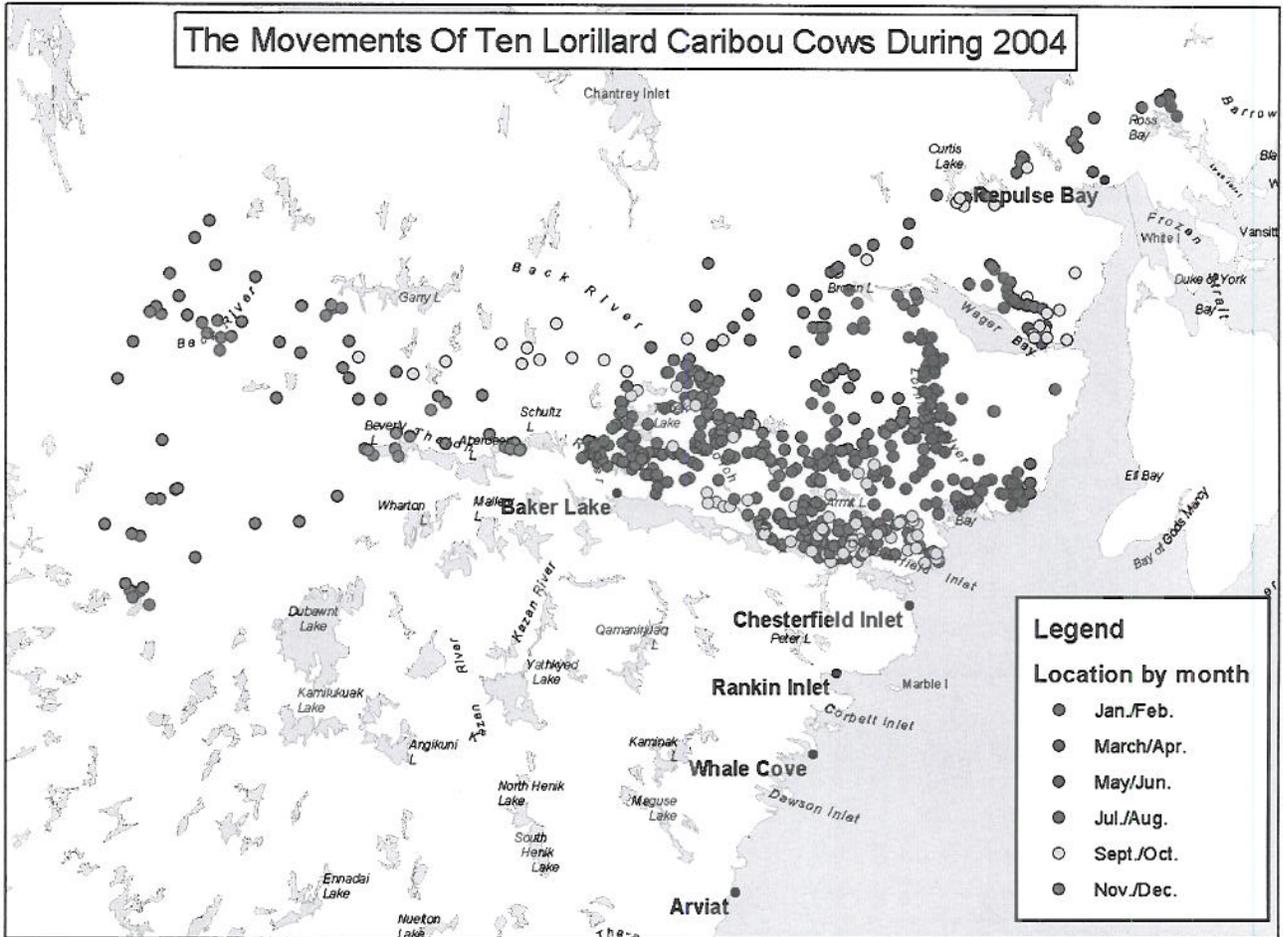Figure 8   The movements of ten Wager caribou cows beginning January 1st 2004 ending December 15th 2004.

The Movements Of Ten Lorillard Caribou Cows During 2004

Figure 8   The movements of ten Lorillard caribou cows beginning January 1st 2004 ending December 15th 2004.

Initial meetings explaining the capturing and collaring process and proposed study schedule with local HTOs have already been completed. More formal meetings were held in Chesterfield Inlet and Repulse Bay following the completion of the deployment and the collection of preliminary data. During this meeting, methods, schedules and current results were discussed. Updated study results were provided to all Kivalliq HTOs and the Kivalliq Wildlife Board in October, 2001, 2002 and 2003. The Department will continue to provide updates to all HTO's and the KWB as results become available or on request. The final results of the study will be communicated both verbally and through the use of visual displays (Posters and Slides) and handouts in both Inuktitut and English on or about November 2007 to take advantage of communities annual general meetings. Verbal information will be relayed to the public through the use of a translator.

Literature Cited:

Calef, G.W. and Helmer, A. 1981. A population estimate for the Melville Peninsula caribou herd in 1976. 16 pp.

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Heard, D.C., Calef, C.W. and Cooper, S. 1981. Numbers, distribution and productivity of caribou in northeastern Keewatin District, N.W.T. 27 pp.

Heard, D.C., Williams, T.M. and Jingfors, K. 1986. Precalving distribution and abundance of barren-ground caribou on the northeastern mainland of the Northwest Territories. Arctic. 39(1): 24-28.

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Budget:

Explanation of Variance:

1. Please note that starred categories (**) indicate that additional expenditures are expected before year-end (estimates are provided).
2. Observer expenses were higher than expected due to poor weather and the need to have the observer on standby during weather days.
3. Scheduled air was nil as the survey plane was able to pick us up and drop us off on route to their base at no additional cost.
4. Meals and accommodation was lower than expected as the accommodation rates for the pilot were incorporated into the air charter hourly rate and the observer was from the community from which the survey was based.
5. Air charter rates were higher then expected due to unexpected increases in hourly rates and adverse weather conditions extending the survey distances due to increased ferrying.
6. Technical services were below expected due to collar mortalities and reduced rates.
7. Printing and graphics are expected to meet the proposed amounts by year-end.

We expect to be over on this budget largely due to the effects poor weather has on increasing project costs.

Northeast Mainland Caribou 2004/05

Expenditure	Budget	Dispersed	Variance
Community observer (40 hrs X $25/hr x 1 Observers)	$1,000.00	$1,331.61	-$331.61
Scheduled air (2 staff X $1000/round trip(Repulse/Chester))	$2,000.00	$0.00	+$2,000.00
Meals/acomm. (north) ($250/night X 10 nights X 3 Staff)	$7,500.00	$3,598.35	+$3,901.65
Air charter (fixed wing) (30hrs X $1200/hr)	$36,000.00	$48,777.86	-$12,777.86
Air charter (rotary) (collar recovery)(10hrs X $900/hr)	$9,000.00**	$9,000.00**	$0.00**
Fuel purchase ($400/drum jet-b X 8 drums)	$3,200.00**	$3,200.00**	$0.00**
Telephone charges (sat phone) (10 calls X $50/call)	$500.00	$874.24	-$374.24
Fuel delivery charges ($200/drum X 8 drums)	$1,600.00	$1,600.00	$0.00
Community contracts (fuel caching)($600/drum X 10 drums)	$6,000.00	$6,054.60	-$54.60
Technical services (south) (Argos 18collars X $2,500/collar)	$45,000.00	$41,853.29	+$3,146.71
Printing/graphics (Toner cartridges + paper/newsletter)	$500.00**	$69.58	+$430.42
Total	**$112,300.00**	**$116,359.53**	**-$4059.53****