



Dehcho Boreal Caribou Study Progress Report, April 2016

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Photo: GNWT/D. Allaire, ENR



The Dehcho boreal caribou study was initiated in 2004 with the deployment of ten satellite collars on adult female caribou at the request of, and after consultation with Smbaa K'e Dene Band (SKDB) of Trout Lake. Extensive consultations in response to requests from other First Nations since have increased the study area and number of First Nations partners in this study. From 2004-2016 a total of 145 collars (mostly ARGOS DS or GPS) have been deployed on adult female boreal caribou (Appendix 1, Figure 1). A more detailed background history of the program, the collars used, and the deployment procedures can be found in Larter and Allaire (2010). This report provides updated results and new information from another year of data.

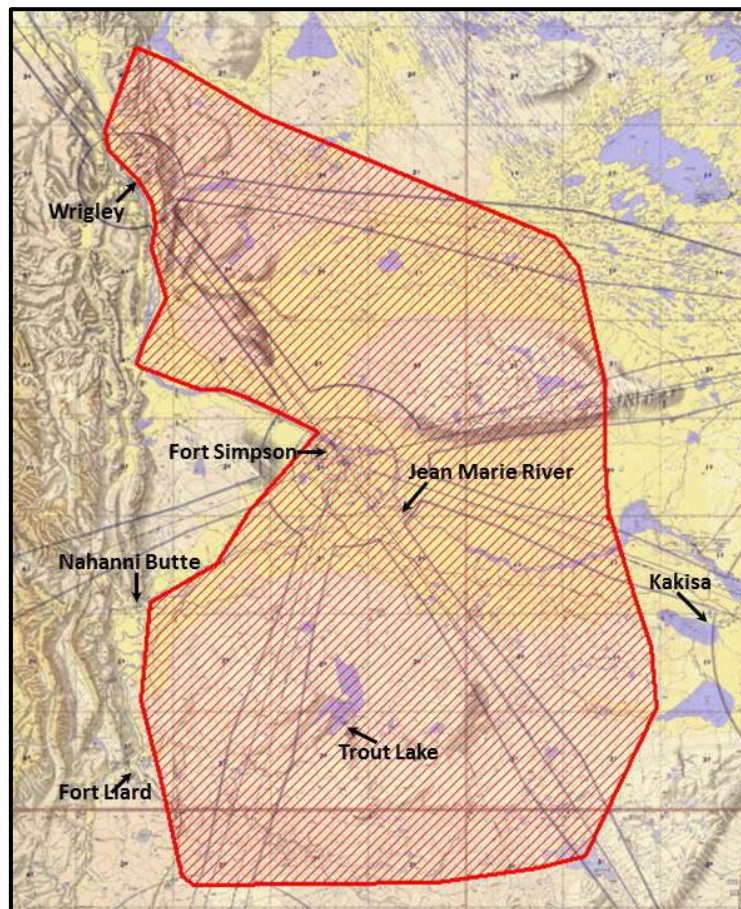


Figure 1. The Dehcho boreal caribou study area, based upon the locations of satellite/GPS collared adult female boreal caribou.

Home Ranges

To date, 103 collared (DS or GPS) caribou have provided locations for ≥ 12 months and 64 collared caribou have provided locations for ≥ 24 months. We used all locations for each of these 103 caribou to calculate 100% minimum convex polygons (MCP) (Figure 2). The MCP is a line connecting all of the outside points where a specific caribou was located and represents the cumulative range used by individual female caribou. Mean range size was 3104.7 km^2 (median 2653.6 km^2 ; range $260.6\text{--}14,419.9 \text{ km}^2$). Ten caribou crossed into northeastern British Columbia (NEBC) and one into northwestern Alberta (Figure 2). Six caribou collared in a NEBC study have crossed the 60° parallel and been located to the southeast of Trout Lake (Brad Culling pers. comm.). One female caribou originally collared in the Cameron Hills (Johnson 2007), was re-captured near Trainor Lake and collared in

February 2007; this collar released in June 2010. We calculated her home range based solely on locations after it was re-collared. The female caribou with the largest range was collared north of Trout Lake in February 2010. She initially moved south of Trout Lake, east towards the Redknife River. More recently, she moved west towards the Netla River and the Liard Highway. Home range sizes we report are similar to those reported for other study areas in the Northwest Territories (NWT) including the Cameron Hills and Hay River Lowlands (Kelly and Cox 2011) and Gwich'in study areas (means of *ca.* 3000 km^2 ; Nagy 2011).

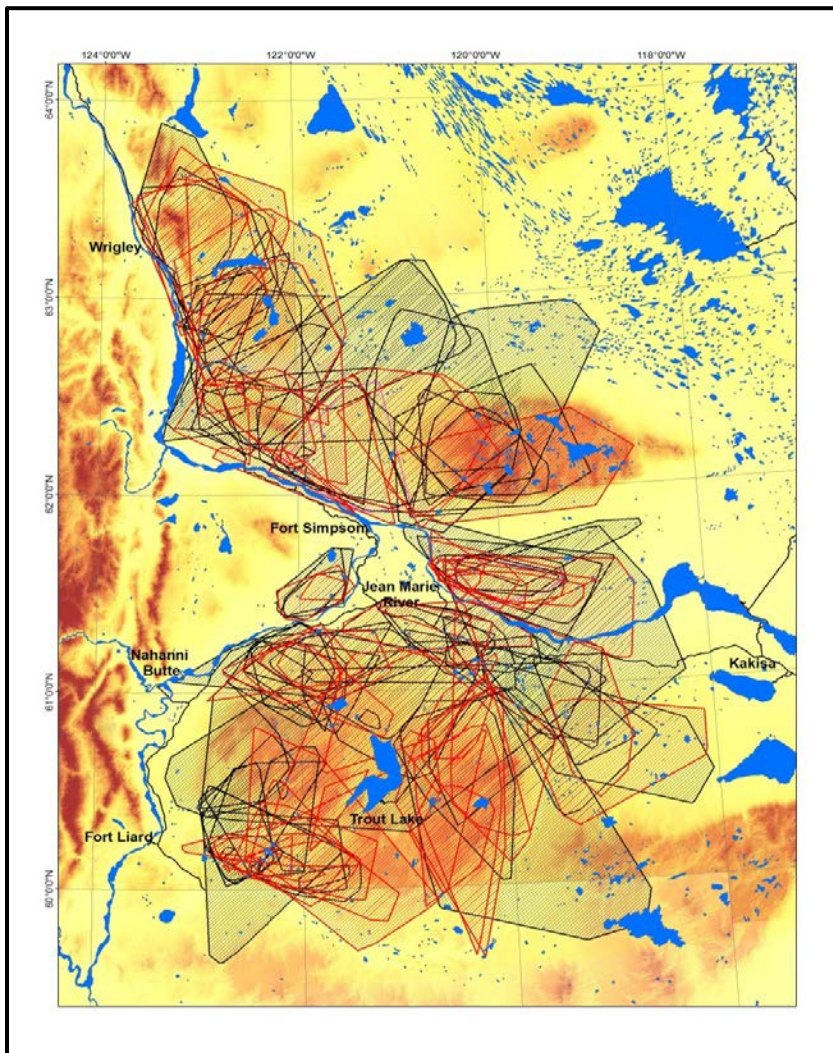


Figure 2. Cumulative ranges (100% MCP) of 103 collared female boreal caribou. Red, females with ARGOS DS collars; black, females with ARGOS GPS collars; and purple, females with Vectronic Iridium GPS collars.

Calving and Calving Events

Female boreal caribou spread out during the calving period, likely to avoid predation (Figure 3). Daily movement rates drop dramatically from *ca.* 6 km/day two days prior to calving, to *ca.* 0.2 km/day on the day of calving, and remain at ≤ 1 km/day for about a week post-calving (Nagy 2011). By analyzing the daily movement patterns of collared female caribou, we can determine when and where a female boreal caribou calved or not; a reliable non-invasive way to monitor calving (Nagy 2011, Demars et al. 2013). By using movement data, we do not fly aerial survey(s) reducing disturbance during the calving period. We do not risk surveying before calves are born or after newborn calves may have died thus getting a more accurate assessment of calf production. Based upon 284 calving events, the peak of calving in our study area is 15 May ± 7 days.

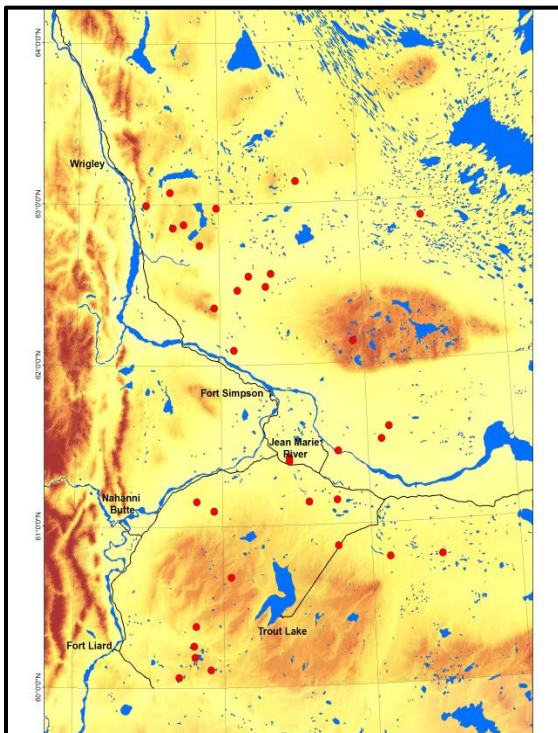


Figure 3. Calving locations of collared boreal caribou ● during 7-23 May, 2015. Note the wide dispersal throughout the range.

Using movement data we determined all potential calving events for all collared caribou from 2004 to 2015 where there was location data from 1 May to 1 June. Of the 303 potential calving events, from 122 different females, the presence or absence of a calf could not be determined for only six instances. There were 284 (94%) births and 13 times when a caribou did not give birth. Serum progesterone levels in blood samples from captured caribou also show a high level (92%) of pregnancy (Table 1). The high number of births and pregnancies from collared females implies that capture and wearing a collar has not prevented females from becoming pregnant nor bearing calves.

Analysis of daily movements showed that all 33 collared females calved in May 2015; one lost its calf shortly after giving birth. Calves were born from 7-23 May with 58% born by 15 May.

Timing and Fidelity of Calving

Individual females have remarkable consistency in calving dates. Of two females that calved successfully for six consecutive years, one had all of her calves within a four day period. Twenty-four females have calved successfully for four consecutive years: two females had three calves born on the same date and five females had all of their calves born within a four-day span. Since the 2007 calving season there have generally been a minimum of 20 calving events annually. In the majority of those years >5 caribou calves were born on the same day.

Whether or not collared caribou show fidelity to calving location is a topic of great debate. From this study we know that female caribou can live to 22 years, have a calf as early as two years and as late as 21 years, and have an average home range of *ca.* 3000 km². We have four consecutive calving events for 24 females and six consecutive calving events for two females. This provides information for only up to about one-quarter of a potential maximum 19 calving events in a lifetime. However, fidelity to an area for calving for a 4-6 year period may have implications related to disturbance mitigation.

Some females calve in the same general area while others do not. For the 24 females that calved successfully for four consecutive years, we measured the distance between each successive and all calving events. Four females had successive calving locations <300 m distant; eleven females <1300 m distant. The average distance between four calving locations for one female was <500 m and for seven other females <6 km. Contrastingly, for five females the average distance between four calving locations was >30 km.

Calf Survival

Although all females calved successfully, calf survival through March this year was the lowest in the past five years, estimated at 24%. Local harvesters commented that the 2015/16 winter was relatively mild again. There was minimal snow cover through February. It was rare for temperatures to drop to -35°C, and when they did it was for only a few days before warming up. It is unlikely that the mobility of predators was hindered by snow cover and with caribou moving around more this winter, the chances of wolves running into caribou is greater.



Boreal caribou, like other deer, have a high probability of conceiving after reaching maturity at 2-3 years old. Based upon the level of progesterone in blood serum, 92% (134 of 145) of collared females were pregnant; six (4.0%) not pregnant and the remaining five borderline (Table 1). The South Slave has similarly high levels of pregnancy based upon blood progesterone (Kelly and Cox 2013).

Table 1. The number of blood samples indicating pregnant, borderline, and not pregnant for collared boreal caribou females over time. Pregnancy determination based upon progesterone levels in blood serum. No collaring occurred in 2011.

	2004	2005	2006	2007	2008	2009	2010	2012	2013	2014	2015	2016
Pregnant	10	12	10	16	7	7	17	14	10	12	11	8
Borderline	0	0	2	1	0	0	1	0	0	0	0	1
Not Pregnant	0	1	1	0	1	1	0	2	0	0	0	0
Total	10	13	13	17	8	8	18	16	10	12	11	9

February/March Classification Survey

This survey is conducted with a helicopter because we need to see all collared caribou and determine the sex/age class of all other caribou we see. Caribou are classified into calves (9-10 months old), yearlings (21-22 months old), females (≥ 32 months old), and males (≥ 32 months old), based upon antler size and shape, and animal size. There is the potential for some yearlings to be mistakenly classified as females or males ≥ 32 months old. Photographs of caribou groups are used to verify classification and the presence of calves. We assume that calves of the year observed in this survey are recruited into the population.



The survey was flown 29 February - 2 March, 2016. Conditions for the survey were ideal, a large snowfall immediately prior to the survey and sunny conditions made fresh tracks highly visible. We observed 213 boreal caribou, 17 moose, and 13 wolves, in two packs, over a flight line of *ca.* 1966 km (Table 2). This was the most wolves we have observed on any classification survey. One pack of six was on a caribou kill site on Willowlake River and the other pack of seven was travelling across Fish Lake.

Eleven of 34 collared females were observed with calves, estimating 32.4 calves per 100 adult females. This is similar to the estimated 31.1 calves per 100 adult females based upon all females and calves observed from the 211 caribou classified in the survey (Table 2). Interestingly, results from the Dehcho were lower than for the adjacent South Slave study areas where estimates were 49.0 calves per 100 collared females and 37.1 calves per 100 adult females from the 318 caribou classified. (Alicia Kelly pers. comm.).

Location data prior to the survey showed that caribou did not become sedentary for extended periods of time during January and February as is the norm in most years. According to local harvesters, the mild temperatures and lack of snow this winter made it easy for wolves to move around. Consequently, caribou were less likely to remain in areas

for extended periods. The extended flight line required to locate collared caribou and the observations of two packs of wolves is consistent with increased movements of both wolves and caribou this winter. Caribou group size increases with increased snow depth (Larter et al. in prep.). This year 26 of 46 groups we observed were ≤ 4 in size.

Caribou collared as part of the Dehcho and South Slave studies move back and forth between study areas. As in the previous three years, the sex/age classification survey in the Dehcho was conducted immediately prior to the survey the South Slave and used some of the same personnel for consistency in classification. For survey efficiency we relocated two South Slave-collared caribou during our survey. No Dehcho-collared caribou were in the South Slave survey area (Table 2).

Table 2. The total number of caribou classified, and other wildlife observed, during sex/age classification surveys conducted in February-March, 2006-2016.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
#of active collars	24	33	35	37	39 ¹	24 ²	30	35 ²	32 ²	39 ¹	34
Total # of caribou observed	170	216	241	291	235	161	197	282	196	303	213
# of females (≥ 32 mo.)	94	114	145	160	128	74	104	153	106	139	119
# of calves (8-10 mo.)	27	26	34	50	45	33	40	43	29	63	37
# of yearlings (20-22 mo.)	13	6	1	1	1	2	1	2	1	2	2
# of males (≥ 32 mo.)	35	70	61	80	61	50	52	84	59	99	53
# unknown sex/age caribou	1	0	0	0	0	2	0	0	1	0	2
# of calves per 100 females	28.7	22.8	23.4	31.3	35.2	44.6	38.5	28.1	27.4	45.3	31.1
# of moose observed	18	38	15	31	23	22	25	18	23	11	17
# of wolves observed	2	1	0	0	0	0	0	0	2	0	13
Flight line length (km)	1,200	1,600	1,700	2,000	1,750	1,655	1,900	1,865	1,787	2,242	1,966

¹ One collared animal located during the South Slave classification survey.

² Two collared animals located during the South Slave classification survey.

Caribou Deaths

Since the start of the study in March 2004, 67 collared caribou have died, 53 of these sites have been visited and the collars retrieved (Table 3). Collars at seven death sites will have active VHF transmissions through summer 2016, but given their location it is highly unlikely that the sites will be visited before VHF transmission ceases. From the 53 death sites visited suspected wolf predation has been the greatest mortality factor (77%; $n=41$). Six caribou were harvested (11%), five died of natural causes associated with malnutrition (9%), and one was black bear predation (Table 3). The majority of adult female caribou deaths occur between late-March and mid-July in any year ($n=45$; 67%).

We have age at death for 25 of the 67 caribou that have died during the study. Age at death is determined by counting stained cementum annuli on teeth (preferably the incisor), similar to counting the rings of a tree (Figure 4). June 1 has historically been used as the birth date for caribou (Matson 1981). Some boreal caribou in our study area live very long lives. Up until this year the age of death included six teenagers, the oldest 17. This summer

caribou #206 died and was aged at 22 years; she had borne calves at 20 and 21 years old. We were unable to determine if she calved at 22 years, 6-8 weeks prior to her death. Just how old was this caribou relative to other caribou elsewhere? As of September 2015, Matson's Laboratory had aged 44,892 caribou teeth from all over North America, only one other tooth (from an Alaskan caribou) was aged at 22 years. Age at death for female boreal caribou in our study area ranges from 4-22 years (mean of 13 and median of 10.5 years; Figure 4). We are still waiting for age of death from one caribou (#205).

Table 3. The number of collared caribou deaths and the suspected cause for each year of the study. Yearly percentages are reported in parentheses. The maximum number of collared animals for each calendar year is indicated.

Apr-Mar Year	Max Collars	Total Deaths	Suspect Wolf (%)	Suspect Bear (%)	Harvest (%)	Natural Causes ¹ (%)	Unknown ² (%)
04/05	10	3	3 (100)	0	0	0	0
05/06	21	7	6 (86)	0	0	1 (14)	0
06/07	27	8	7 (88)	0	0	1 (13)	0
07/08	35	4	2 (50)	1 (25)	1 (25)	0	0
08/09	36	6	3 (50)	0	2 (33)	0	1 (17)
09/10	39	7	5 (71)	0	2 (29)	0	0
10/11	40	4	2 (50)	0	0	0	2 (50)
11/12	26	6	3 (50)	0	1 (17)	0	2 (33)
12/13	33	3	2 (67)	0	0	0	1 (33)
13/14	37	8	1 (13)	0	0	3 (38)	4 (50)
14/15	32	2	1 (50)	0	0	0	1 (50)
15/16	43	9	6 (67)	0	0	0	3 (33)
TOTAL		67	41	1	6	5	14

¹ This includes four caribou suspected of succumbing to malnourishment.

² These death sites have never been investigated.

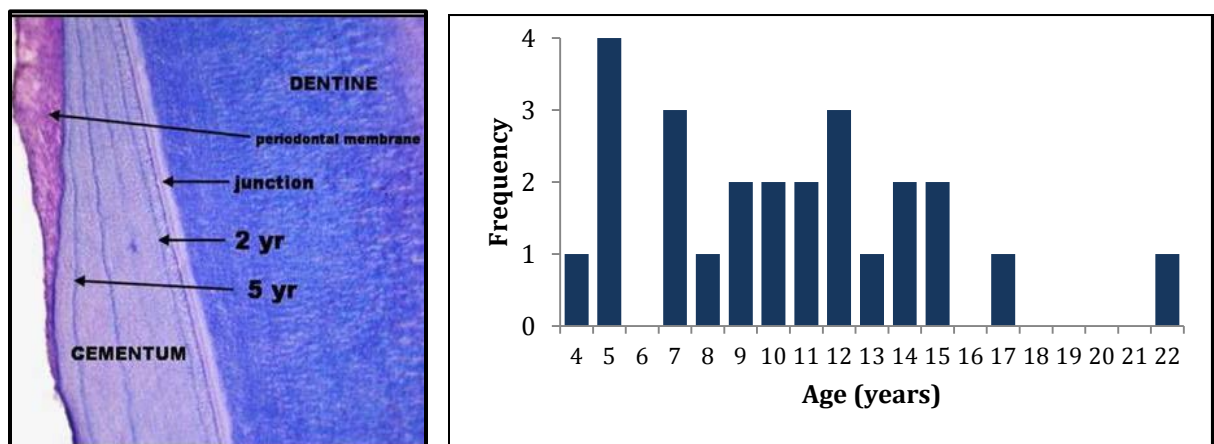


Figure 4. *Left:* The stained section of a tooth root. The dark blue lines are stained cementum. *Right:* The frequency of age at death for 25 female boreal caribou. Age was determined by counting cementum annuli.

Wolves have greater access to boreal caribou habitat by using seismic lines (Neufeld 2006). Increased access has resulted in more caribou mortalities (McLoughlin et al. 2003). In the NWT boreal caribou use areas ≤ 400 m from anthropogenic linear features less than other areas, and travel faster when they encounter linear features (Nagy 2011). The remains of 17 of 42 (40%) caribou preyed by wolves or black bears were located ≤ 400 m from anthropogenic linear features.

Released Collars

To date, 37 of 135 collars have remained on female caribou until their scheduled date of release. Three collars released this year; none could be retrieved before VHF transmissions ended; only 11 of the 37 release collars have been retrieved. Collars often release in isolated locations, far from communities, and inaccessible by helicopter. Retrieved collars are refurbished if possible. None of the collars deployed in 2004 ($n=10$) had release mechanisms.

Adult Female Survival

Annual adult female survival of collared females was based upon 34 females that were alive with functioning collars on 1 April 2015 and determined following Kaplan and Meier (1958) and Pollock et al. (1989). Three collars released in the summer and another three collars had poor transmission during the winter and were not included in the analysis. Annual adult female survival estimated for 2015/16 was 74% (Table 4). This is lower than our best estimate (geometric mean) over the past 11 years which is 79% (see Figure 5). We did not include the estimates from 2004-05 due to a small sample size (ten collars) and the restricted area of deployment. Estimated adult female survival rate we report is similar to that reported for the Cameron Hills (81% average from five years; Kelly and Cox 2011), but lower than that reported for the Hay River Lowlands (86% average from seven years; Kelly and Cox 2011), the Gwich'in ($\geq 95\%$ average from three years; Nagy 2011) areas of the Lower Mackenzie, and for most populations in Alberta (range 78-91%; Hervieux et al. 2013). Low adult female survival reduces the population rate of increase.

Nagy (2011) found that boreal caribou populations were more viable in areas with fewer seismic lines, and where there were larger patches of secure unburned habitat. Adult female survival in the north Dehcho is higher (82%) than survival in the south Dehcho (77%), as is recruitment at 37.2 calves per 100 adult females in the north versus 35.4 in the south. There are fewer seismic lines, and more, larger patches of unburned habitat in the Dehcho north of the Mackenzie River versus the Dehcho south of the Mackenzie River; a finding consistent with Nagy (2011).

Table 4. The estimated annual population rate of increase (λ) for 11 successive years. Rates for the south Dehcho are calculated for caribou collared south of the Mackenzie River, rates for the north Dehcho for caribou collared north of the Mackenzie River.

South Dehcho

Year	Female Survival Rate	Calf:100 Females	Rate of Increase (λ)
2005-2006	0.6250	25.87	0.7179
2006-2007	0.6429	26.16	0.7396
2007-2008	0.9375	24.70	1.0696
2008-2009	0.8235	40.00	1.0294
2009-2010	0.8500	46.67	1.1087
2010-2011	0.7143	55.55	0.9890
2011-2012	0.8750	24.43	0.9968
2012-2013	0.9231	55.55	1.2781
2013-2014	0.6429	20.00	0.7143
2014-2015	1.0000	42.11	1.2667
2015-2016	0.6875	23.53	0.7792

North Dehcho

Year	Female Survival Rate	Calf:100 Females	Rate of Increase (λ)
2005-2006	0.6000	33.18	0.7193
2006-2007	0.7500	19.99	0.8333
2007-2008	0.8235	21.77	0.9241
2008-2009	0.8750	35.29	1.0625
2009-2010	0.8235	66.67	1.2353
2010-2011	1.0000	73.33	1.5789
2011-2012	0.7692	62.50	1.1189
2012-2013	0.8462	5.88	0.8718
2013-2014	0.7143	13.33	0.7653
2014-2015	1.0000	40.00	1.2500
2015-2016	0.7778	41.18	0.9794

Dehcho Combined

Year	Female Survival Rate	Calf:100 Females	Rate of Increase (λ)
2005-2006	0.6191	28.81	0.7232
2006-2007	0.6923	22.86	0.7817
2007-2008	0.8788	23.35	0.9949
2008-2009	0.8286	36.11	1.0111
2009-2010	0.8378	52.38	1.1351
2010-2011	0.8571	66.67	1.2857
2011-2012	0.8095	43.33	1.0334
2012-2013	0.8846	31.43	1.0496
2013-2014	0.6786	16.67	0.7403
2014-2015	1.0000	41.03	1.2581
2015-2016	0.7353	32.35	0.8772

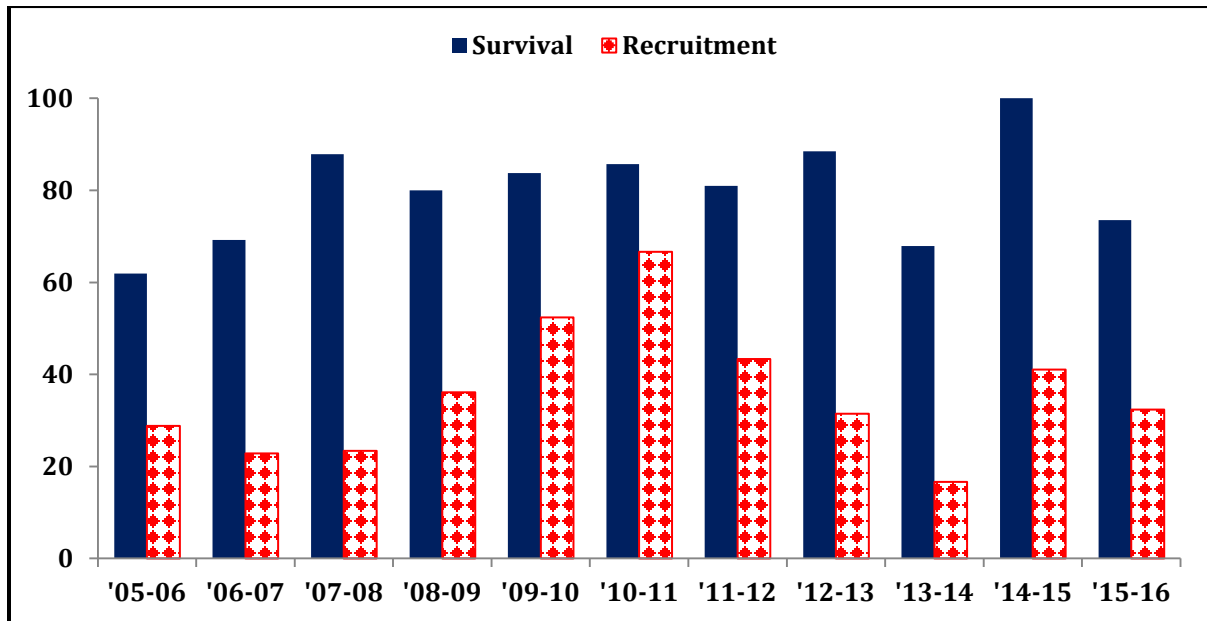


Figure 5. Adult female survival (%) and calves:100 adult females in March (recruitment) for the Dehcho study area from 2005-06 to 2015-16, based on radio-collared female caribou.

Estimated Population Rate of Increase

We estimated the population rate of increase (λ) measured from April 1 - March 31 for 11 successive years for all caribou collared throughout the entire study area. We made separate estimates for caribou collared north and south of the Mackenzie River (Table 4; Figure 5). We based the λ estimate on annual female survival and the ratio of calves per 100 adult females (calf:cow) reported in March (Hatter and Bergerud 1991). Of note is that prior to 2009, the March ratio of calf:cow was estimated from all animals observed during the classification surveys. From 2009 to present, we had a larger sample size of collared and therefore known females. Because it is collared females that are used to estimate adult survival, and adult females are harvested, we estimated calf:cow solely from the collared females. We feel this is the most appropriate estimation of recruitment assuming that the collared females are a representative sample of all females. A rate of increase, or λ , of one indicates population stability, <1 indicates population decrease, and >1 indicates population increase. Small sample sizes affect the confidence of the estimate.

Even with relatively high estimated annual rates of increase during years 2009/10-2010/11 and 2014/15, the average estimated rate of increase over the past 11 years remains <1 ($\lambda = 0.97$) (Table 4). If we had started with a population of 1,000 adult female caribou in 2004, and used our estimated annual population rates of increase there would be 716 adult females today (Figure 6). Figure 6 also demonstrates how a single year with a combination of both low adult female survival and low recruitment, or conversely, high adult female survival and high recruitment, can have a major impact on annual population rates of increase. For 2015/16, the combination of average calf recruitment with below average adult survival, resulted in an estimated annual $\lambda <1$ (0.88; Table 4).

The population rate of increase we report ($\lambda = 0.97$ mean over 11 years) is similar to the Hay River Lowlands (HRL; $\lambda = 0.96$ mean over seven years) but greater than the Cameron Hills (CH; $\lambda = 0.87$ mean over five years) study areas, (Kelly and Cox 2011) and greater than most boreal caribou populations in Alberta (Hervieux et al. 2013).

Adult female survival is higher in HRL, CH, and most populations in Alberta, but calf recruitment in these areas is generally much lower than in the Dehcho. Low calf recruitment appears to be reducing λ in HRL, CH, and in Alberta boreal caribou populations regardless, of >80% adult female survival. The past years' increased recruitment in the HRL should have a positive influence on λ for that study area. The population rate of increase reported for the Gwich'in areas in the Lower Mackenzie over two to three years was $\lambda = 1.08-1.20$ (Nagy 2011); here both female survival and late winter calf:cow are higher.

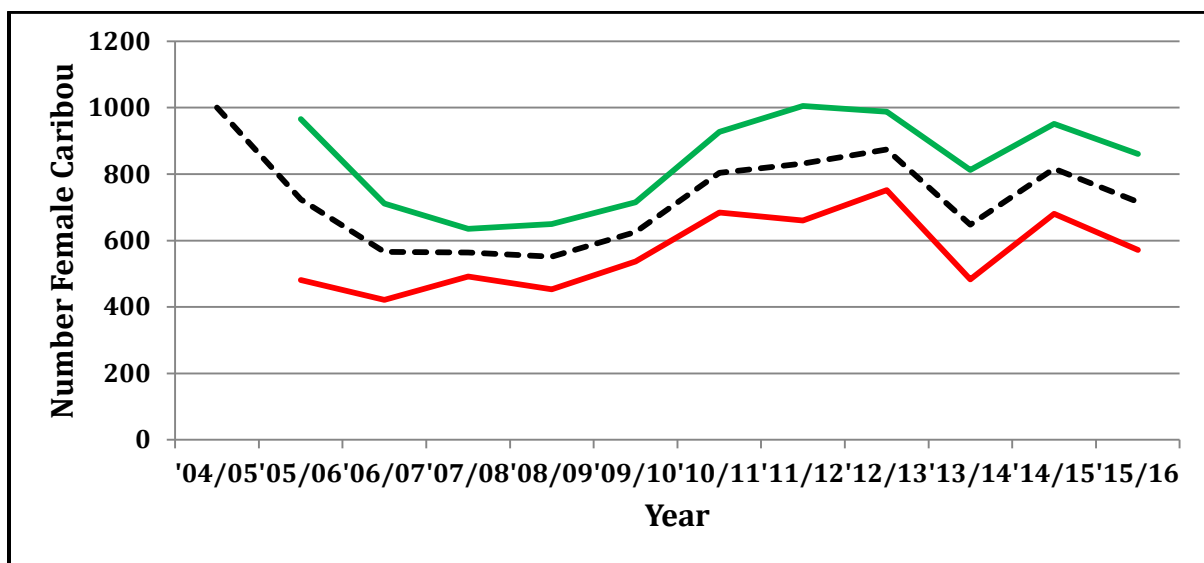


Figure 6. The estimated number of female caribou in each year of the study starting with a population of 1,000 and using the annual rates of increase (λ) calculated for the 11 successive years. The green and red lines represent the upper and lower 95% confidence intervals.

Wolf Survey

As part of a cooperative inter-jurisdictional project the first aerial wolf survey was conducted in the Dehcho from 25-30 January, 2016. The survey method followed (Serrouya et al. 2015). An accurate survey needs to be able to fly lines spaced 3 km apart over the study area during consecutive days that start three days after a fresh snowfall. An area of ca. 4,350 km² located in the southwestern part of the Dehcho study area was surveyed. Four different packs were identified within the



Photo: GNWT/N. Larter, ENR

survey area during the survey period (21-23 wolves counted); old tracks from two additional edge packs were also detected. Packs varied in size from 3+ to nine animals. One pack was observed on a kill site; no other kill sites were reported. Additional observations included sightings of 49 moose (35 while searching for wolf tracks; the remaining while following wolf tracks) and ten caribou (six while searching; four while tracking). The biologist found good snow tracking conditions, but experienced poor lighting conditions at times, and the survey was interrupted by turbulence on one day. The survey results were considered to be robust. A more detailed report will be completed later in the year.

Animal Fatness

For a second year we used an ultrasound to measure the layer of rump fat of captured caribou so that estimates of ingesta-free body fat could be made (Cook and Cook 2015). Last year, as a pilot project, ultrasound measurements showed that body fat in female boreal caribou in the Dehcho and South Slave was significantly greater than for boreal caribou from northeastern British Columbia. Only one female caribou measured in the NWT in February 2015 had body fat levels <6% whereas 25% of boreal caribou females measured in NEBC had body fat levels <6% (John Cook pers. comm.). Fatter caribou are more likely to get pregnant and have calves. This year (February 2016) saw similar results; average body fat of boreal caribou in the Dehcho was about 9%, one female had body fat <6% while the fattest was just over 12%. On average, the 139 boreal caribou measured in NEBC were not as fat as those measured in the NT (John Cook pers. comm.).



Disease and Parasites

Boreal caribou in the Dehcho are relatively disease and parasite free with low numbers of parasites and disease antibodies; none were a cause of concern (Johnson et al. 2010). Winter ticks (*Dermacentor albipictus*) were found for the first time this year on boreal caribou females in the Dehcho; samples were collected from two caribou. Winter ticks have been documented on boreal caribou females in both the South Slave and North Slave regions (Brad Culling pers. comm.).

Recent studies of boreal caribou populations in NEBC have reported the presence of a pathogenic bacterium *Erysipelothrix rhusiopathiae*, which has the potential to adversely affect survival and reproduction (Schwantje et al. 2014). In order to determine if *E. rhusiopathiae* is present in boreal caribou in the Dehcho, The Department of Environment and Natural Resources (ENR) provided 64 serum samples from caribou captured from years 2010 and 2012-2015 for testing (no caribou were captured in 2011). We are still awaiting a full diagnosis but there is evidence of exposure to the bacterium from three of these samples (Bryan Macbeth pers. comm.). Three historic and the nine blood samples from the

2016 capture have yet to be submitted. Fecal samples from the nine caribou collared females in February 2016 were analyzed for disease and parasites; four had a very low incidence of a common parasite (either *Eimeria* spp. or a *Trichostrongyle*) and none tested positive for *Giardia* spp. or *Cryptosporidium* spp.

Present and Future of the Study

We continue to work collaboratively with other researchers conducting boreal caribou studies. Nic Larter is a member of the Dehcho Boreal Caribou Working Group (DBCWG). Data from this study have been incorporated into various territorial-wide analyses, and used as part of a Master's program at the University of Alberta. Data are being used by the ENR in the development of Range Management Plans for Boreal Caribou. We have provided demographic information to Environment Canada for their latest national modeling exercise on boreal caribou population demography *"Enhanced Analysis to Support Application of Risk-based Disturbance Thresholds for Regional Boreal Caribou Range Planning and Action Planning"*. The DBCWG continues to endorse ongoing monitoring of boreal caribou in the Dehcho using collared caribou and has suggested the need to consider collaring male boreal caribou. The boreal caribou program was endorsed by delegates of the 7th biannual regional wildlife workshop, in October 2014. Program results will be updated and the program critiqued at the 8th biannual Dehcho regional wildlife workshop, in Fort Simpson, 18-19 October, 2016. Collaring males will be a topic of discussion.

We continue to make every attempt to retrieve collars so they can be refurbished for re-deployment. We hope to visit more mortality sites this summer. We deploy only GPS collars, the majority Telonics ARGOS with a few GPS-PLUS from Vectronics Aerospace. This year we deployed three Telonics Iridium collars. The cost of both the collars and data acquisition is somewhat less than for ARGOS collars. We anticipate deploying more Iridium collars in future to reduce costs. There continues to be support from our First Nations partners for annual deployment of collars to maintain a minimum of 30 active collars on females throughout the study area during the calving period.

Deliverables

ENR provides this annual progress report to its First Nations partners, to the Western Northwest Territories Biophysical Study, and to the Cumulative Impacts Monitoring Program. The report is posted on the ENR website. ENR provides quarterly maps to its First Nations partners. The maps show the ranges used by individual collared female caribou over the previous three months.

Presentations were made to the DBCWG. A presentation of program results was made at the NWT Environmental Research and Monitoring Results Workshop held in Fort Simpson, 19-20 January, 2016. Our collaborators will be presenting results of the ultrasound work at the 16th North American Caribou Workshop in May.

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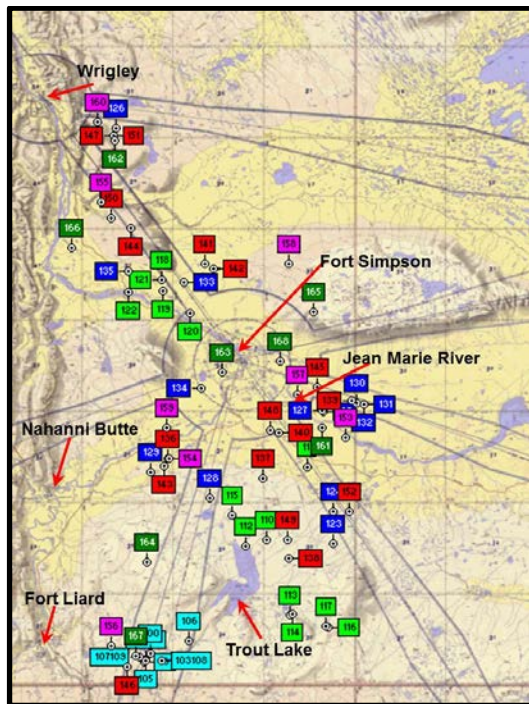
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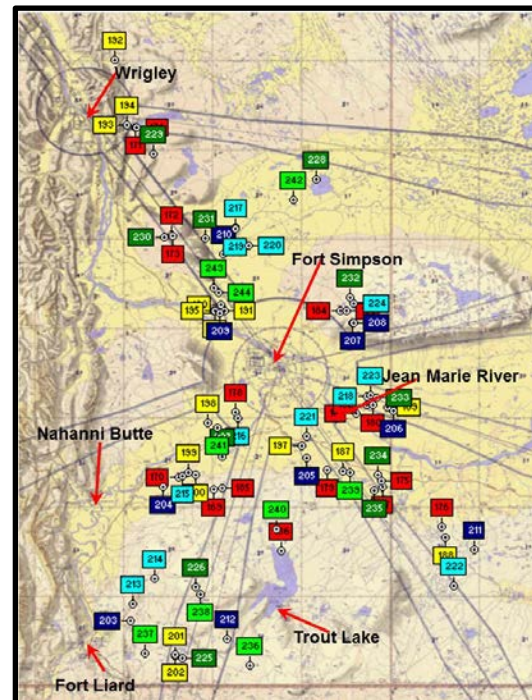


Appendix 1. The number and type of collars deployed on adult females throughout the course of the study (Table) and deployment locations for each year (Figures).

Date caribou collared	Satellite (ST-20-3610 or TAW-4610H)	GPS (TGW-3680 or TGW-4680)	GPS (TGW-4570) Iridium	VHF (Mod 600)	Vectronic GPS-PLUS 2	Totals
March 2004	10					10
March 2005	13					13
January 2006	9			4		13
January 2007	8	9				17
February 2008	4	4				8
February 2009	1	7				8
February 2010	9	9				18
February 2012	2	14				16
February 2013	1	8			1	10
February 2014		12				12
February 2015		9			2	11
February 2016		5	3		1	9
TOTAL	57	77	3	4	4	145



Locations of 69 female boreal caribou collared in 2004, 2005, 2006, 2007, 2008, 2009 (see colour for locations).



Locations of 76 female boreal caribou collared in 2010, 2012, 2013, 2014, 2015, 2016 (see colour for locations).

Appendix 2. Collar retrievals during the past year.

- 18 August, helicopter north of the Mackenzie River retrieved collars from caribou #206 (south of Upper Spence Creek), caribou #234 (west of Notana Lake, five wolves still in the area), and caribou #235 (south of the Trout Lake winter road near the Enbridge pipeline).
- 19 August, helicopter to Willowlake River retrieved collar from caribou #219.
- 21 August, helicopter to Horn Plateau retrieved collar from caribou #224 15 km northwest of Mustard Lake.
- 9 September, truck to Liard Highway #7 near km post 180 retrieved collar from caribou #215 2.5 km south of Liard highway.

Appendix 3. A timeline of each collared caribou since 2004. The collar type (GPS, Sat = Satellite, VHF) is noted as well as whether most recently only VHF signals are being received. **Black font** indicates currently active collars on caribou. **Blue font** indicates released caribou collars. **Green font** indicates unknown status/no release mechanisms on caribou collars. **Red font** indicates collars of known dead caribou. **Orange font** indicates collars of known dead caribou where death was natural causes which included being related to malnutrition. **Purple** indicates collars of known harvested caribou.

Caribou #244 (GPS)

- 15 Feb/16 collared
- 29 Feb/16 seen in group of 7 with calf

Caribou #243 (GPS, Iridium)

- 15 Feb/16 collared
- 29 Feb/16 seen in group of 2 with calf

Caribou #242 (GPS, Iridium)

- 15 Feb/16 collared
- 29 Feb/16 seen in group of 3 with calf

Caribou #241 (GPS, Iridium)

- 9 Feb/16 collared
- 1 Mar/16 seen in group of 12 with calf

Caribou #240 (GPS)

- 9 Feb/16 collared
- 1 Mar/16 seen in group of 11 with calf

Caribou #239 (GPS-PLUS 2)

- 9 Feb/16 collared
- 2 Mar/16 seen in group of 4 with #221 without calf

Caribou #238 (GPS)

- 8 Feb/16 collared
- 1 Mar/16 seen in group of 4 without calf

Caribou #237 (GPS)

- 8 Feb/16 collared
- 1 Mar/16 seen in group of 9 with #212 without calf

Caribou #236 (GPS)

- 8 Feb/16 collared
- 1 Mar/16 seen in group of 2 without calf

Caribou #235 (GPS-PLUS 2, died)

- 20 Feb/15 collared
- 4 Mar/15 seen in group of 6 without calf
- Died 30 June/15 at age 8 years
- 18 Aug/15 collar retrieved, five wolves still at kill site

Caribou #234 (GPS, died)

- 20 Feb/15 collared
- 4 Mar/15 seen in group of 3 with calf
- Died 15 July/15 at age 7 years
- 18 Aug/15 collar retrieved

Caribou #233 (GPS-PLUS 2)

- 20 Feb/15 collared
- 3 Mar/15 seen in group of 8 with #218, #223 without calf
- 2 Mar/16 seen in group of 4 with calf

Caribou #232 (GPS)

- 19 Feb/15 collared
- 3 Mar/15 seen in group of 3 without calf

- 29 Feb/16 seen in group of 6 with calf

Caribou #231 (GPS)

- 19 Feb/15 collared
- 2 Mar/15 seen in group of 6 with calf
- 29 Feb/16 seen in group of 4 with calf

Caribou #230 (GPS)

- 19 Feb/15 collared
- 2 Mar/15 seen in group of 13 without calf
- 29 Feb/16 seen in group of 4 without calf

Caribou #229 (GPS)

- 19 Feb/15 collared
- 2 Mar/15 seen in group of 10 without calf
- 29 Feb/16 seen in group of 7 without calf

Caribou #228 (GPS)

- 19 Feb/15 collared
- 2 Mar/15 seen in group of 15 without calf
- 2 Mar/16 seen alone without calf

Caribou #227 (GPS)

- 18 Feb/15 collared
- 3 Mar/15 seen in group of 2 with calf
- 1 Mar/16 seen in group of 10 without calf

Caribou #226 (GPS)

- 18 Feb/15 collared
- 3 Mar/15 seen in group of 6 with calf
- 1 Mar/16 seen in group of 8 without calf

Caribou #225 (GPS)

- 18 Feb/15 collared
- 3 Mar/15 seen in group of 10 with calf
- 1 Mar/16 seen alone without calf

Caribou #224 (GPS, died)

- 10 Feb/14 collared
- Unable to relocate 3 Mar/14, GPS didn't initialize properly during deployment
- Received transmissions in April
- Unable to relocate 3 Mar/15, no VHF signal at waypoint
- Died 31 May/15 at 15 years
- 21 Aug/15 collar retrieved

Caribou #223 (GPS)

- 10 Feb/14 collared
- 5 Mar/14 seen in group of 2 with #206 without calf
- 3 Mar/15 seen in group of 8 with #218, #233 without calf
- 2 Mar/16 seen in group of 4 without calf

Caribou #222 (GPS)

- 8 Feb/14 collared
- 5 Mar/14 seen in group of 3 without calf
- 4 Mar/15 seen in group of 8 without calf
- 2 Mar/16 seen in group of 6 without calf

Caribou #221 (GPS)

- 8 Feb/14 collared
- 4 Mar/14 seen in group of 2 without calf
- 3 Mar/15 seen in group of 4 without calf
- 2 Mar/16 seen in group of 6 with #239 without calf

Caribou #220 (GPS)

- 8 Feb/14 collared
- 3 Mar/14 seen in group of 3 without calf
- 2 Mar/15 seen in group of 7 with calf
- 29 Feb/16 seen in group of 3 without calf

Caribou #219 (GPS, died)

- 8 Feb/14 collared
- 3 Mar/14 seen in group of 5 without calf
- 2 Mar/15 seen in group of 5 with calf
- Died 28 April/15 at age 7 years
- 19 Aug/15 collar retrieved

Caribou #218 (GPS)

- 7 Feb/14 collared
- 5 Mar/14 seen in group of 5 without calf
- 3 Mar/15 seen in group of 8 with #223, #233 without calf
- 2 Mar/16 seen in group of 2 with calf

Caribou #217 (GPS)

- 7 Feb/14 collared
- 3 Mar/14 seen in group of 4 without calf
- 2 Mar/15 seen in group of 8 without calf
- 29 Feb/16 seen alone without calf

Caribou #216 (GPS)

- 6 Feb/14 collared
- 3 Mar/14 seen in group of 12 without calf
- 3 Mar/15 seen in group of 12 with calf
- 1 Mar/16 seen in group of 4 without calf

Caribou #215 (GPS, died)

- 6 Feb/14 collared
- 4 Mar/14 seen in group of 9 with #204 without calf
- 3 Mar/15 seen in group of 3 with #204 without calf
- Died 21 May/15
- 9 Sept/15 collar retrieved

Caribou #214 (GPS)

- 6 Feb/14 collared
- 4 Mar/14 seen in group of 6 with #202 without calf
- 3 Mar/15 seen in group of 3 without calf
- 1 Mar/16 seen in group of 2 without calf

Caribou #213 (GPS)

- 6 Feb/14 collared
- 4 Mar/14 seen in group of 3 without calf
- 3 Mar/15 seen in group of 10 with #212 without calf
- 1 Mar/16 seen in group of 4 without calf

Caribou #212 (GPS)

- 27 Feb/13 collared
- 5 Mar/13 seen in group of 7 with calf
- 4 Mar/14 seen in group of 5 without calf
- 3 Mar/15 seen in group of 10 with #213 without calf
- 1 Mar/16 seen in group of 9 with #237 with calf

Caribou #211 (Sat, died)

- 14 Feb/13 collared
- 6 Mar/13 seen in group of 5 with calf
- 5 Mar/14 seen in group of 6 without calf

- 4 Mar/15 seen in group of 12 without calf
- Died 18 Aug/15

Caribou #210 (GPS, died)

- 12 Feb/13 collared
- 4 Mar/13 seen in group of 16 without calf
- 3 Mar/14 seen alone without calf
- 2 Mar/15 seen alone without calf
- Died 27 June/15

Caribou #209 (GPS-PLUS 2)

- 12 Feb/13 collared
- 4 Mar/13 seen in group of 6 with #196 without calf
- 3 Mar/14 seen in group of 2 with calf
- 4 Mar/15 seen in group of 23 without calf
- 29 Feb/16 seen in group of 3 without calf

Caribou #208 (GPS, died, non-predation)

- 12 Feb/13 collared
- 5 Mar/13 seen in group of 8 without calf
- Died 30 June/13 at age 12 years, death related to malnutrition
- 11 Sept/13 collar retrieved

Caribou #207 (GPS, died)

- 12 Feb/13 collared
- 4 Mar/13 seen alone without calf
- Died 15 Nov/13

Caribou #206 (GPS, died)

- 12 Feb/13 collared
- 5 Mar/13 seen in group of 4 without calf
- 5 Mar/14 seen in group of 2 with #223 without calf
- 3 Mar/15 seen in group of 2 with calf

- Died 17 July/15 at age 22 years
- 18 Aug/15 collar retrieved

Caribou #205 (GPS, died, non-predation)

- 11 Feb/13 collared
- 5 Mar/13 seen in group of 5 without calf
- Died 30 June/13
- 9 Oct/14 collar retrieval

Caribou #204 (GPS)

- 11 Feb/13 collared
- 5 Mar/13 seen in group of 10 with #169, #170 with calf
- 4 Mar/14 seen in group of 9 with #215 with calf
- 3 Mar/15 seen in group of 3 with #215 with calf
- 1 Mar/16 seen in group of 6 with calf

Caribou #203 (GPS)

- 11 Feb/13 collared
- 5 Mar/13 seen in group of 7 without calf
- 4 Mar/14 seen in group of 7 with calf
- 3 Mar/15 seen in group of 3 with calf
- 1 Mar/16 seen in group of 2 without calf

Caribou #202 (GPS, no visual)

- 14 Mar/12 collared
- Did not relocate in 2012, was collared after survey
- 5 Mar/13 seen in group of 6 without calf
- 4 Mar/14 seen in group of 6 with #214 without calf
- Unable to relocate 3 Mar/15, waypoint was older, no VHF signal

Caribou #201 (GPS, no visual)

- 14 Mar/12 collared
- Did not relocate in 2012, was collared after survey
- 5 Mar/13 seen in group of 11 without calf
- 4 Mar/14 seen in group of 6 with calf
- Unable to relocate 3 Mar/15, no GPS locations during survey
- Active GPS in April

Caribou #200 (GPS, died)

- 17 Feb/12 collared
- 2 Mar/12 seen with #199 but without calf
- 5 Mar/13 seen in group of 4 with calf
- 4 Mar/14 seen alone without calf
- 3 Mar/15 seen in group of 2 with calf
- Died 17 Mar/15

Caribou #199 (Sat, no visual)

- 17 Feb/12 collared
- 2 Mar/12 seen with #200 but without calf
- 5 Mar/13 seen in group of 13 without calf
- 4 Mar/14 seen in group of 4 without calf
- 3 Mar/15 seen in group of 5 without calf
- Unable to relocate 2 Mar/16, no GPS locations during survey

Caribou #198 (GPS, died)

- 17 Feb/12 collared
- 2 Mar/12 seen in group of 4 without calf
- 5 Mar/13 seen in group of 13 with calf
- Died 14 July/13 at age 12 years
- 21 Oct/13 collar retrieved

Caribou #197 (GPS, died)

- 17 Feb/12 collared
- 1 Mar/12 seen in group of 6 without calf
- 5 Mar/13 seen in group of 2 with calf
- 4 Mar/14 seen alone without calf
- 3 Mar/15 seen alone without calf
- Died 9 Sept/15

Caribou #196 (GPS)

- 16 Feb/12 collared
- 29 Feb/12 seen in group of 4 with calf
- 4 Mar/13 seen in group of 6 with #209 without calf
- 3 Mar/14 seen in group of 2 with calf
- 2 Mar/15 seen in group of 7 with calf
- 29 Feb/16 seen in group of 4 without calf

Caribou #195 (GPS, unknown status)

- 16 Feb/12 collared
- 29 Feb/12 seen in group of 7 without calf
- 4 Mar/13 seen in group of 4 without calf
- 3 Mar/14 seen in group of 8 without calf
- No GPS locations last 6 months

Caribou #194 (Sat, died)

- 16 Feb/12 collared
- 29 Feb/12 seen in group of 4 without calf
- 4 Mar/13 seen in group of 3 without calf
- Died 20-22 Dec/13

Caribou #193 (GPS)

- 16 Feb/12 collared

- 29 Feb/12 seen in group of 7 with calf
- 4 Mar/13 seen in group of 4 without calf
- 3 Mar/14 seen in group of 5 without calf
- 2 Mar/15 seen in group of 5 with calf
- 29 Feb/16 seen in group of 3 without calf

Caribou #192 (GPS, died)

- 16 Feb/12 collared
- 29 Feb/12 seen alone
- 4 Mar/13 seen in group of 5 without calf
- Died 11 Jan/14
- 14 Jan/14 collar retrieved by trapper

Caribou #191 (GPS)

- 15 Feb/12 collared
- 29 Feb/12 seen in group of 4 with calf
- 4 Mar/13 seen in group of 5 without calf
- 3 Mar/14 seen in group of 7 without calf
- 2 Mar/15 seen in group of 19 without calf
- 29 Feb/16 seen in group of 4 without calf

Caribou #190 (GPS, died)

- 15 Feb/12 collared
- 29 Feb/12 seen in group of 3 with calf
- Died 25 Mar/12
- 19 June/13 collar retrieved

Caribou #189 (GPS, VHF only)

- 15 Feb/12 collared
- 1 Mar/12 could not relocate in area

- 15 Mar/12 relocated in fixed-wing weak VHF signal
- 21 June/12 no satellite location

Caribou #188 (GPS, died, non-predation)

- 15 Feb/12 collared
- 1 Mar/12 seen in group of 3 without calf
- 6 Mar/13 seen in group of 3 with #151.790 without calf
- Died 27 June/13 at age 13 years, death related to malnutrition
- 11 Sept/13 collar retrieved

Caribou #187 (GPS, died)

- 15 Feb/12 collared
- 1 Mar/12 seen in group of 4 without calf
- 6 Mar/13 seen in group of 4 with #151.980 without calf
- Died 10 July/13

Caribou #186 (GPS, released)

- 27 Feb/10 collared
- 2 Mar/10 seen with calf
- 2 Mar/11 seen in group of 5 with calf
- 2 Mar/12 seen in group of 4 with calf
- 5 Mar/13 seen in group of 13 without calf
- 15 June/13 released
- 11 Sept/13 collar retrieved

Caribou #185 (GPS, died)

- 27 Feb/10 collared
- 2 Mar/10 seen alone, collar is resetting
- 3 Aug/10 located, no visual
- 2 Mar/11 seen in group of 4 with calf
- Died 22 Apr/11
- 24 Aug/12 unsuccessful retrieval attempt

- 11 Sept/13 collar retrieved

Caribou #184 (GPS, released)

- 26 Feb/10 collared
- 1 Mar/10 seen in group of 6 with calf
- 1 Mar/11 seen in group of 7 with calf
- 1 Mar/12 seen in group of 4 with calf
- 4 Mar/13 seen in group of 4 without calf
- 15 June/13 released

Caribou #183 (Sat)

- 26 Feb/10 collared
- 1 Mar/10 seen in group of 6 without calf
- 1 Mar/11 seen in group of 13 without calf
- 29 Feb/12 seen in group of 2 without calf
- 4 Mar/13 seen in group of 5 without calf
- 3 Mar/14 seen alone without calf
- 3 Mar/15 seen in group of 9 without calf
- 15 June/15 released

Caribou #182 (GPS, died)

- 26 Feb/10 collared
- 1 Mar/10 seen with cow
- 1 Mar/11 seen in group of 7 with calf
- 1 Mar/12 seen in group of 3 with calf
- Died 5 Aug/12 at age 4 years
- 2 Oct/12 collar retrieved

Caribou #181 (Sat, died)

- 26 Feb/10 collared
- 1 Mar/10 seen in group of 3 without calf

- 1 Mar/11 seen in group of 4 with calf
- Died 25 Apr/11

Caribou #180 (Sat, died)

- 26 Feb/10 collared
- 1 Mar/10 seen in group of 8 with calf
- 1 Mar/11 seen in group of 5 with calf
- 29 Feb/12 seen in group of 3 without calf
- Died 12 July/12

Caribou #179 (GPS, died)

- 25 Feb/10 collared
- 2 Mar/10 seen in group of 11 with calf
- Died 25 Nov/10
- 22 Feb/11 collar retrieved on Trout Lake

Caribou #178 (Sat, died)

- 25 Feb/10 collared
- 1 Mar/10 seen in group of 3 with calf
- Died 8 Oct/10
- 1 Mar/11 no signal at location

Caribou #177 (GPS, released)

- 25 Feb/10 collared
- 2 Mar/10 seen alone
- 25 Feb/11 seen with calf
- 1 Mar/12 seen in group of 9 without calf
- 6 Mar/13 seen in group of 2 with calf
- 15 June/13 released
- 11 Sept/13 collar retrieved

Caribou #176 (Sat, died)

- 25 Feb/10 collared
- 2 Mar/10 seen in group of 3 without calf

- 25 Feb/11 seen in group of 7 without calf
- 1 Mar/12 seen with calf
- Died 13 Aug/12 at age 10 years
- 2 Oct/12 collar retrieved

Caribou #175 (Sat, died)

- 25 Feb/10 collared
- 2 Mar/10 seen in group of 5 without calf
- Died 6 Sep/10
- 23 Nov/10 no caribou at signal location - inaccessible

Caribou #174 (GPS, released)

- 24 Feb/10 collared
- 1 Mar/10 seen with cow
- 1 Mar/11 seen in group of 5 with calf
- 29 Feb/12 seen in group of 8 with calf
- 4 Mar/13 seen in group of 11 without calf
- 15 June/13 released
- 11 Sept/13 collar retrieved

Caribou #173 (GPS, died)

- 24 Feb/10 collared
- 1 Mar/10 seen in group of 8 with calf
- 1 Mar/11 seen in group of 5 without calf
- Died 16 Apr/11 at age 9 years
- 24 Apr/12 collar retrieved

Caribou #172 (Sat)

- 24 Feb/10 collared
- 1 Mar/10 seen with calf
- 1 Mar/11 seen in group of 3 with calf
- 29 Feb/12 seen in group of 4 without calf
- 4 Mar/13 seen in group of 15 without calf

- 3 Mar/14 seen in group of 2 without calf
- 2 Mar/15 seen in group of 5 with calf
- 15 June/15 released

Caribou #171 (Sat)

- 24 Feb/10 collared
- 1 Mar/10 seen in group of 13 with #160 with calf
- 1 Mar/11 seen in group of 7 with calf
- 29 Feb/12 seen in group of 5 with calf
- 4 Mar/13 seen in group of 3 with calf
- 3 Mar/14 seen in group of 4 without calf
- 2 Mar/15 seen in group of 5 with calf
- 15 June/15 released

Caribou #170 (Sat, died)

- 23 Feb/10 collared
- 2 Mar/10 seen in group of 7 with #137 with calf
- 2 Mar/11 seen in group of 7 without calf
- 2 Mar/12 seen in group of 4 with #169 but without calf
- 5 Mar/13 seen in group of 10 with #169, #204 with calf
- 5 Mar/13 seen in group of 10 with #169, #204 with calf
- Died 29-31 Oct/13

Caribou #169 (GPS, released)

- 23 Feb/10 collared
- 2 Mar/10 seen alone
- 2 Mar/11 seen with calf
- 2 Mar/12 seen in group of 4 with #170 but without calf
- 5 Mar/13 seen in group of 10 with #170, #204 with calf

- 15 June/13 released

Caribou #168 (GPS, released)

- 19 Feb/09 collared
- 2 Mar/09 seen in group of 5 without calf
- 1 Mar/10 seen in group of 4 with calf
- 1 Mar/11 seen in group of 9 with calf
- 1 Jan/12 ceased satellite transmissions
- 29 Feb/12 seen in group of 4 with calf
- 10 June/12 released

Caribou #167 (GPS, died)

- 18 Feb/09 collared
- 3 Mar/09 seen in group of 7 without calf
- Died 22 Mar/09
- 5 Jun/09 collar retrieved

Caribou #166 (GPS, died)

- 19 Feb/09 collared
- 2 Mar/09 seen in group of 10 with #155 but without calf
- 1 Mar/10 seen in group of 4 without calf
- 1 Mar/11 seen alone
- Died 30 Oct/11

Caribou #165 (GPS, released)

- 19 Feb/09 collared with calf
- 2 Mar/09 seen in group of 14 with calf
- 1 Mar/10 seen in group of 10 with calf
- 1 Mar/11 seen in group of 9 with calf
- 29 Feb/12 seen with calf
- 10 June/12 released

Caribou #164 (GPS, released)

- 18 Feb/09 collared
- 3 Mar/09 seen in group of 4 without calf
- 2 Mar/10 seen in group of 3 without calf
- 2 Mar/11 seen with calf
- 2 Mar/12 seen in group of 6 without calf
- 10 June/12 released

Caribou #163 (GPS, died)

- 19 Feb/09 collared
- 3 Mar/09 seen in group of 9 without calf
- 1 Mar/10 seen with calf
- Died 15 April/10
- 14 Jun/10 signal from under ice on Liard River
- 3 Aug/10 collar unfrozen, ice has melted
- 5 Aug/10 collar retrieved

Caribou #162 (GPS, harvested)

- 19 Feb/09 collared
- 2 Mar/09 seen in group of 11 without calf
- 3 May/09 shot by harvester
- 24 May/09 collar retrieved

Caribou #161 (Sat, released)

- 18 Feb/09 collared
- 2 Mar/09 seen in group of 5 without calf
- 2 Mar/10 seen with cow
- 12 Nov/10 satellite transmission ceased
- 2 Jun/11 released

Caribou #160 (Sat, released)

- 17 Feb/08 collared with calf
- 3 Mar/08 seen in group of 5 with calf
- 28 May/08 no visual

- 2 Mar/09 seen in group of 14 without calf
- 1 Mar/10 seen in group of 13 with #171 and with calf
- 1 Mar/11 seen alone
- 29 Feb/12 seen in group of 6 with calf
- 4 Mar/13 seen in group of 4 without calf
- 7 Mar/13 released

Caribou #159 (Sat, released)

- 16 Feb/08 collared
- 4 Mar/08 seen in group of 24 without calf
- 21 Apr/08 located with 134
- 28 May/08 seen without calf
- 3 Mar/09 seen in group of 8 without calf
- 1 Mar/10 seen in group of 10 without calf
- 2 Mar/11 seen in group of 16 with #134 but without calf
- 2 Mar/12 seen in group of 7 without calf
- 5 Mar/13 seen in group of 8 with calf
- 7 Mar/13 released

Caribou #158 (Sat, died)

- 17 Feb/08 collared
- 3 Mar/08 seen with cow
- 28 May/08 seen with calf
- 2 Mar/09 seen in group of 6 with calf
- Died 2 June/09, couldn't find death date, was underwater
- 2 Jun/09 collar retrieved

Caribou #157 (Sat, released)

- 17 Feb/08 collared
- 3 Mar/08 seen in group of 5 without calf
- 23 May/08 lost satellite signal

- 29 May/08 seen in group of 3 with calf
- 2 Mar/09 seen in group of 5 with calf
- 1 Mar/10 seen in group of 5 without calf
- 30 Sep/10 collar released

Caribou #156 (GPS, died)

- 18 Feb/08 collared with calf
- 4 Mar/08 seen in group of 4 with calf
- 29 May/08 seen without calf
- 3 Mar/09 seen in group of 14 with calf
- Died 14 Apr/09
- 13 Jul/09 collar retrieved

Caribou #155 (GPS, harvested)

- 17 Feb/08 collared
- 3 Mar/08 seen in group of 6 without calf
- 28 May/08 seen with calf
- 2 Mar/09 seen in group of 10 with #166 but without calf
- Died 29 Jul/09 shot by harvester
- 21 Sep/09 collar retrieved

Caribou #154 (GPS, released)

- 17 Feb/08 collared
- 5 Mar/08 seen in group of 19 without calf
- 29 May/08 seen with calf
- 4 Mar/09 seen in group of 5 with calf
- 2 Mar/10 seen in group of 7 with calf
- 2 Mar/11 seen with calf
- 1 Jul/11 collar released

Caribou #153 (GPS, released)

- 16 Feb/08 collared with calf
- 4 Mar/08 seen in group of 4 without calf

- 29 May/08 seen without calf
- 2 Mar/09 seen in group of 5 with calf
- 2 Mar/10 seen in group of 4 with calf
- 2 Mar/11 seen in group of 6 without calf
- 1 Jul/11 collar released

Caribou #152 (GPS, died)

- 23 Jan/07 collared
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen with calf
- 4 Mar/08 seen with cow
- 30 May/08 seen with calf
- 3 Mar/09 seen in group of 10 without calf
- 2 Mar/10 seen in group of 9 with calf
- Died 25 Mar/10
- 21 May/10 tried to relocate by helicopter, too much water
- 22 Feb/11 ground relocation attempt but no signal
- 28 Aug/12 collar retrieved, VHF stopped working

Caribou #151 (GPS, harvested)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 6 without calf
- 29 May/07 seen with calf
- 3 Mar/08 seen in group of 8 without calf
- 28 May/08 seen with calf
- Died 9 Aug/08 by Fish Lake likely shot by harvester
- 2 Jun/09 collar retrieved

Caribou #150 (GPS, harvested)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 2 without calf

- 29 May/07 seen with calf
- 3 Mar/08 seen with cow
- Died 15 May/08 likely shot by harvester
- 17 Jun/08 collar retrieved

Caribou #149 (GPS, released)

- 24 Feb/07 collared
- 27 Feb/07 seen in group of 7 without calf
- 30 May/07 seen with calf
- 4 Mar/08 seen in group of 10 without calf
- 29 May/08 seen with calf
- 3 Mar/09 seen in group of 9 with calf
- 3 Mar/10 seen in group of 12 without calf
- 2 Jun/10 collar released
- 8 Oct/10 collar retrieved

Caribou #148 (Sat, released)

- 24 Jan/07 collared
- 26 Feb/07 seen in group of 12 without calf
- 30 May/07 seen without calf
- 4 Mar/08 seen with calf
- 29 May/08 seen with calf
- 2 Mar/09 seen in group of 3 without calf
- 30 Sep/09 collar released
- 2 Mar/10 collar located from air in inaccessible area

Caribou #147 (Sat, died)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 8 without calf
- 30 May/07 seen without calf
- 3 Mar/08 seen in group of 9 without calf
- 28 May/08 seen with calf
- Died 17 July/08
- 17 Aug/09 collar retrieved

Caribou #146 (Sat, released)

- 21 Jan/07 collared
- 27 Feb/07 seen in group of 11 with calf
- 30 May/07 seen with calf
- 4 Mar/08 seen in group of 4 with calf
- 29 May/08 seen without calf
- 2 Jul/08 lost satellite signal
- 3 Mar/09 seen in group of 3 with #108 but without calf
- 2 Mar/10 seen in group of 4 with calf
- 30 Sep/10 collar released

Caribou #145 (Sat, released)

- 21 Jan/07 collared
- 27 Feb/07 seen in group of 3 without calf
- 30 May/07 seen without calf
- 3 Mar/08 seen in group of 4 with calf
- 29 May/08 seen with calf
- 2 Jul/08 lost satellite signal
- 2 Mar/09 seen in group of 5 with calf
- 1 Mar/10 seen in group of 4 with calf
- 30 Sep/10 collar released

Caribou #144 (Sat, harvested)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 10 without calf
- Died 4 Apr/07 shot by harvester
- 12 Apr/07 collar retrieved

Caribou #143 (Sat, released)

- 21 Jan/07 collared
- 26 Feb/07 seen in group of 6 without calf
- 29 May/07 seen with calf
- 20 Nov/07 seen in group of 4

- 04 Sep/07 lost satellite transmission
- 4 Mar/08 seen in group of 6 without calf
- 26 Mar/08 located, no visual
- 21 Apr/08 located, no visual
- 29 May/08 not located, no signal
- 3 Mar/09 seen in group of 2 without calf
- 14 May/09 located, no visual
- 1 Jun/09 seen with calf
- 9 Jul/09 located, no visual
- 12 Aug/09 located, no visual
- 2 Sept/09 located, no visual
- 28 Oct/09 located, no visual
- 22 Nov/09 located, no visual
- 22 Feb/10 located, no visual
- 2 Mar/10 seen in group of 4 without calf
- 3 Aug/10 located, no visual
- 30 Sep/10 collar released
- 23 Nov/10 no caribou at collar location
- 31 Jan/11 no caribou at signal location

Caribou #142 (Sat, unknown status)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 10 without calf
- 29 May/07 seen with calf
- 3 Mar/08 seen in group of 4 without calf
- Died before 9 May/08
- 28 May/08 no VHF signal from last known satellite location, collar likely underwater

Caribou #141 (Sat, died)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 2 without calf
- Died 16 Apr/07
- 13 Jul/07 collar retrieved

Caribou #140 (GPS, died)

- 24 Jan/07 collared
- 26 Feb/07 seen in group of 3 without calf
- 30 May/07 seen without calf
- Died 28 Oct/07 at age 5 years
- 25 Apr/08 collar retrieved

Caribou #139 (GPS, died)

- 21 Jan/07 collared
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen in group of 4 with calf
- 3 Mar/08 seen with calf
- 29 May/08 seen with calf
- 2 Mar/09 seen in group of 3 without calf
- Died 7 July/09 at age 9 years
- 10 Aug/09 collar retrieved

Caribou #138 (GPS, released)

- 23 Jan/07 collared
- 27 Feb/07 seen in group of 4 without calf
- 30 May/07 seen without calf
- 4 Mar/08 seen in group of 8 without calf
- 29 May/08 seen with calf
- 3 Mar/09 seen in group of 17 without calf
- 2 Mar/10 seen in group of 3 without calf
- 2 Jun/10 collar released

Caribou #137 (GPS, released)

- 23 Jan/07 collared
- 27 Feb/07 seen in group of 5 without calf
- 29 May/07 seen with calf
- 5 Mar/08 seen with calf
- 29 May/08 seen in group of 3 with calf

- 3 Mar/09 seen in group of 13 with calf
- 2 Mar/10 seen in group of 7 with #170 with calf
- 2 Jun/10 collar released
- 3 Aug/10 no caribou at signal location
- 23 Nov/10 no caribou at signal location

Caribou #136 (GPS, released)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 5 without calf
- 29 May/07 seen without calf
- 5 Mar/08 seen in group of 19 without calf
- 29 May/08 seen with calf
- 7 Mar/09 seen in group of 7 without calf
- 2 Mar/10 seen in group of 3 without calf
- 2 Jun/10 collar released
- 3 Aug/10 no caribou at signal location

Caribou #135 (VHF, died)

- 21 Jan/06 collared
- 1 Mar/06 seen in group of 4 without calf
- 30 May/06 without calf
- 28 Sep/06 no visual
- 23 Feb/07 seen in group of 6 without calf
- Died 23-28 May/07
- 31 May/07 collar retrieved

Caribou #134 (VHF, released)

- 21 Jan/06 collared
- 1 Mar/06 seen in group of 3
- 29 May/06 seen with calf
- 16 Sep/06 seen in group of 4
- 26 Feb/07 seen in group of 2 without calf

- 29 May/07 seen without calf
- 15 Feb/08 seen in group of 13 without calf
- 4 Mar/08 seen in group of 24 without calf
- 26 Mar/08 located, no visual
- 21 Apr/08 located with #159
- 28 May/08 seen with calf
- 3 Mar/09 seen in group of 9 with calf
- 14 May/09 located, no visual
- 1 Jun/09 seen with calf
- 9 Jul/09 located, no visual
- 12 Aug/09 located, no visual
- 2 Sep/09 located, no visual
- 28 Oct/09 located, no visual
- 22 Nov/09 located, no visual
- 22 Feb/10 located, no visual
- 1 Mar/10 seen in group of 3 with calf
- 14 Jun/10 located, no visual
- 3 Aug/10 located, no visual
- 23 Nov/10 located, no visual
- 31 Jan/11 located, no visual
- 1 Mar/11 seen in group of 16 including #159 and with calf
- 4 July/11 collar released

Caribou #133 (VHF, unknown status)

- 21 Jan/06 collared
- 1 Mar/06 seen with calf
- 30 May/06 seen with calf
- 23 Jan/07 seen in group of 10 without calf
- 26 Feb/07 seen in group of 3 without calf
- 29 May/07 seen with calf
- Unable to relocate since Dec/07
- 4 July/11 collar released

Caribou #132 (VHF, released)

- 22 Jan/06 collared

- 1 Mar/06 seen in group of 9 with calf
- 29 May/06 approx. location not pregnant
- 16 Sep/06 seen in group of 2 without calf
- 26 Feb/07 seen in group of 3 without calf
- 30 May/07 seen with calf
- 15 Feb/08 seen in group of 5 without calf
- 4 Mar/08 seen in group of 5 without calf
- 26 Mar/08 located, no visual
- 21 Apr/08 located, no visual
- 29 May/08 not located
- 1 Mar/09 collar released
- 2 Mar/09 located collar in mortality mode, no caribou at signal location

Caribou #131 (Sat, released)

- 22 Jan/06 collared
- 1 Mar/06 seen with calf
- 29 May/06 without calf
- 16 Sep/06 seen in group of 3 cows without calf
- 21 Jan/07 seen in group of 5 with calf
- 27 Feb/07 seen in group of 5 without calf
- 30 May/07 seen with calf
- 03 Mar/08 seen in group of 8 with calf
- 29 May/08 seen with calf
- 2 Mar/09 seen in group of 4 with calf
- 15 Apr/09 collar released

Caribou #130 (Sat, died, non-predation)

- 22 Jan/06 collared
- 1 Mar/06 seen in group of 7 without calf
- 29 May/06 without calf

- Died 5 Jul/06 at age 5-6 years, death related to malnutrition
- 23 Aug/06 collar retrieved

Caribou #129 (Sat, died)

- 20 Jan/06 collared
- 1 Mar/06 seen in group of 6 without calf
- 30 May/06 seen with calf
- 16 Sep/06 with calf
- 21 Jan/07 seen in group of 4 with calf
- 26 Feb/07 seen in group of 10 with calf
- 29 May/07 seen with calf
- 05 Mar/08 seen without calf
- Died 27 May/08 at age 5 years
- 29 May/08 collar retrieved

Caribou #128 (Sat, released)

- 20 Jan/06 collared
- 2 Mar/06 seen in group of 5 without calf
- 30 May/06 seen in group of 4 with calf
- 16 Sep/06 seen in group of 3 without calf
- 27 Feb/07 seen in group of 5 without calf
- 29 May/07 seen with calf
- 04 Mar/08 seen in group of 10 with calf
- 29 May/08 seen with calf
- 22 Oct/08 collar finished transmitting
- 3 Mar/09 seen in group of 3 with calf
- 2 Mar/10 seen in group of 7 without calf
- 3 Mar/10 collar released

Caribou #127 (Sat, died)

- 22 Jan/06 collared
- 1 Mar/06 seen in group of 7 with calf
- 29 May/06 seen with calf
- Died 21 Jul/06 at age 7 years
- 16 Sep/06 confirm wolf predation
- 23 Oct/06 collar retrieved

Caribou #126 (Sat, died)

- 21 Jan/06 collared
- 1 Mar/06 seen in group of 5 with yearling
- 30 May/06 seen with calf
- 26 Feb/07 seen in group of 13 without calf
- 29 May/07 seen without calf
- 03 Mar/08 seen in group of 14 without calf
- 28 May/08 seen with calf
- 2 Mar/09 seen in group of 5 without calf
- Died 28 Apr/09 at age 12 years
- 8 Jun/10 collar retrieved

Caribou #125 (Sat, died)

- 22 Jan/06 collared
- 1 Mar/06 seen in group of 16 with yearling
- 29 May/06 seen with small calf
- Died 12-15 Jul/06, likely wolf predation
- 16 Sep/06 no visual
- 23 Oct/06 collar retrieved

Caribou #124 (Sat, died)

- 20 Jan/06 collared
- 2 Mar/06 seen in group of 7 without calf
- Died 10 April/06, likely wolf predation
- 23 Aug/06 collar retrieved

Caribou #123 (Sat, died)

- 20 Jan/06 collared
- 2 Mar/06 seen in group of 4 with calf
- 29 May/06 without calf
- 16 Sep/06 seen in group of 3
- Died 5 Nov/06 on Trainor Lake
- 15 Feb/07 locate collar in ice
- 27 Feb/07 collar retrieved

Caribou # 122 (Sat, harvested)

- 4 Mar/05 collared
- 21 Mar/05 seen in group of 3
- 30 Mar/05 seen in group of 3
- 1 Jun/05 seen alone without calf
- 4 Jun/05 no visual
- 23 Sep/05 no visual
- 10 Oct/05 no visual
- 31 Nov/05 no satellite signal
- 4 Apr/05 got satellite signal back
- 30 May/05 seen without calf
- 24 Nov/06 no satellite signal
- 15 Jun/07 collar went off air finishing transmissions
- 14 Apr/14 caribou shot by harvester
- 15 Apr/11 collar handed in by harvester

Caribou #121 (Sat, died)

- 4 Mar/05 collared
- 21 Mar/05 seen in group of 3
- Died 26-27 Mar/05 at age 10 years predated by wolves
- 30 Mar/05 collar retrieved

Caribou #120 (Sat, released)

- 4 Mar/05 collared
- 21 Mar/05 seen in group of 13
- 30 Mar/05 seen in group of 3
- 1 Jun/05 no visual
- 4 Jun/05 seen alone without calf
- 23 Sep/05 seen in group of 14

- 10 Oct/05 no visual
- 16 Jan/06 seen in group of 3
- 1 Mar/06 seen in group of 5
- 30 May/06 without calf
- 26 Feb/07 seen in group of 10 without calf
- 30 May/07 seen without calf
- 7 Dec/07 seen in group of 4 without calf
- 3 Mar/08 seen in group of 4 without calf
- 28 May/08 seen with calf
- 7 Oct/08 transmissions from collar ceased
- 2 Mar/09 see in group of 6 without calf
- 3 Mar/09 collar released
- 29 Aug/09 collar retrieved

Caribou # 119 (Sat, released)

- 4 Mar/05 collared
- 21 Mar/05 seen in group of ≥ 8
- 30 Mar/05 no visual
- 1 Jun/05 seen alone without calf
- 23 Sep/05 no visual
- 10 Oct/05 no visual
- 16 Jan/06 in group of 5 without calf
- 1 Mar/06 in group of 4
- 30 May/06 with calf
- 22 Jan/07 in group of 3 with calf
- 26 Feb/07 in group of 11 with calf
- 29 May/07 seen without calf
- 3 Mar/08 seen with cow
- 28 May/08 seen with calf
- 10 Sep/08 satellite transmission ceased
- 2 Mar/09 seen in group of 5 without calf
- 3 Mar/09 collar released
- 2 Jun/09 collar retrieved

Caribou # 118 (Sat, died)

- 4 Mar/05 collared
- 21 Mar/05 seen in group of 10
- 30 Mar/05 seen in group of 9
- 1 Jun/05 no visual
- 4 Jun/05 no visual
- Died 13 Jun/05 at age 15 years, likely wolf predation
- 6 Sep/05 collar retrieved

Caribou #117 (Sat, died)

- 3 Mar/05 collared
- 31 May/05 seen alone without calf
- 10 Jun/05 seen in thick brush
- 23 Sep/05 seen in group of at least 4
- 26 Jan/06 seen in group of 4 with calf
- 2 Mar/06 seen in group of 5 with calf
- Died 18 Apr/06
- 23 Aug/06 collar retrieved

Caribou #116 (Sat, released)

- 3 Mar/05 collared
- 31 May/05 seen alone without calf
- 10 Jun/05 no visual
- 23 Sep/05 seen in group of 3
- 26 Jan/06 seen in group of 7 with calf
- 2 Mar/06 seen in group of 4 with calf
- 29 May/06 seen with calf
- 16 Sep/06 seen in group of 2 without calf
- 23 Jan/07 seen in group of 12 without calf
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen in group of 3 with calf
- 4 Mar/08 seen with bull
- 29 May/08 seen with calf

- 13 Oct/08 satellite transmission ceased
- 3 Mar/09 seen in group of 17 without calf
- 3 Mar/09 collar released
- 7 Jul/09 collar retrieved

Caribou #115 (Sat, released)

- 3 Mar/05 collared
- 10 Apr/05 seen in group of 3
- 31 May/05 seen alone without calf
- 23 Sep/05 no visual
- 5 Oct/05 seen in group of 2 without calf
- 2 Mar/06 seen in group of 9 without calf
- 30 May/06 seen in group of 2 without calf
- 16 Sep/06 seen in group of 4 without calf
- 27 Feb/07 seen in group of 4 without calf
- 29 May/07 seen with calf
- 04 Mar/08 seen with 2 cows
- 30 May/08 seen with calf
- 1 Oct/08 satellite transmissions ceased
- 4 Mar/09 seen in group of 3 with calf
- 3 Mar/09 collar released
- 10 Aug/09 collar retrieved

Caribou #114 (Sat, released)

- 3 Mar/05 collared
- 10 Apr/05 seen in group of 9
- 31 May/05 no visual
- 10 Jun/05 seen alone without calf
- 23 Sep/05 no visual
- 2 Mar/06 seen in group of 6 without calf
- 29 May/06 seen in group of 3 without calf
- 16 Sep/06 seen in group of 3 without calf

- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen with without calf
- 4 Mar/08 seen in group of 7 without calf
- 29 May/08 seen with calf
- 3 Jul/09 satellite transmissions ceased
- 3 Mar/09 seen in group of 13 with calf
- 3 Mar/09 collar released
- 1 Jun/09 collar retrieved

Caribou #113 (Sat, died)

- 3 Mar/05 collared
- 10 Apr/05 seen in group of 4
- 31 May/05 no visual
- 10 Jun/05 seen alone without calf
- Died 10 Sep/05 likely wolf predation
- 5 Oct/05 collar retrieved

Caribou #112 (Sat, released)

- 3 Mar/05 collared
- 10 Apr/05 seen with calf
- 31 May/05 seen with calf
- 10 Jun/05 seen with calf
- 23 Sep/05 no visual
- 1 Mar/06 seen in group of 6 with calf
- 30 May/06 seen in group of 4 with calf
- 16 Sep/06 seen with calf
- 27 Feb/07 seen in group of 5 with calf
- 29 May/07 seen with calf
- 5 Mar/08 seen with 2 bulls
- 30 Jun/08 located, no visual
- 22 Oct/08 satellite transmission ceased
- 3 Mar/09 collar released
- 6 Jul/09 collar retrieved

Caribou #111 (Sat, released)

- 3 Mar/05 collared
- 5 May/05 seen in group of 2
- 31 May/05 seen with calf
- 23 Sep/05 seen in group of 5 with calf
- 1 Mar/06 seen in group of 9 without calf
- 29 May/06 seen with calf
- 16 Sep/06 seen in group of 3
- 24 Jan/07 seen in group of 14
- 27 Feb/07 seen in group of 4 with calf
- 30 May/07 seen with calf
- 4 Mar/08 seen in group of 8 with calf
- 28 May/08 seen with calf
- 11 Nov/08 satellite transmission ceased
- 3 Mar/09 seen in group of 11 with calf
- 3 Mar/09 collar released
- 10 Jul/09 collar retrieved

Caribou #110 (Sat, died)

- 5 Mar/05 collared
- 5 May/05 seen alone without calf
- 31 May/05 seen alone without calf
- Died 2 Jun/05 at 17 years, likely wolf predation
- 29 Jul/05 collar retrieved

Caribou #109 (Sat, died)

- 1 Apr/04 collared
- 29 May/04 no visual
- 22 Sep/04 seen in group of 4 without calf
- 31 May/05 seen with calf
- 19 Jun/05 seen with calf
- 23 Sep/05 no visual
- 5 Oct/05 seen in group of 3 with calf
- Died 22 Apr/06, likely wolf predation

- 23 Aug/06 collar retrieved

Caribou #108 (Sat, observed alive, no Sat or VHF active)

- 1 Apr/04 collared
- 29 May/04 seen alone without calf
- 3 Jun/04 no visual
- 22 Sep/04 seen in group of 3 without calf
- 25 Jan/05 seen in group of 4 without calf
- 31 May/05 no visual
- 10 Jun/05 no visual
- 19 Jun/05 seen with calf
- 23 Sep/05 no visual
- 5 Oct/05 seen in group of 5 with calf
- 2 Mar/06 seen in group of 3 with yearling
- 30 May/06 seen with calf
- 23 Jan/06 seen in group of 5 with calf
- 27 Feb/07 seen in group of 11 with calf
- 30 May/07 seen in group of 3 with calf
- 15 Jun/07 satellite transmissions ceased
- 3 Mar/09 seen in group of 3 with #146, no VHF transmissions
-

Caribou #107 (Sat, died)

- 1 Apr/04 collared
- 29 May/04 no visual
- 22 Sep/04 seen in group of 3 with calf
- Died 22 Apr/05 likely wolf predation
- 4 May/05 collar retrieved

Caribou #106 (Sat, died)

- 30 Mar/04 collared
- 29 May/04 no visual

- 3 Jun/04 seen in group of 2 with calf
- 22 Sep/04 seen in group of 7 without calf
- 25 Jan/05 seen in group of 5 without calf
- 31 May/05 seen alone without calf
- 23 Sep/05 seen in group of 2 without calf
- Died 12 Nov/05, likely wolf predation
- 30 May/06 collar retrieved

Caribou #105 (Sat, died)

- 30 Mar/04 collared
- 29 May seen in group of 3 with calf
- 22 Sep/04 no visual
- 25 Jan/05 seen in group of 3 without calf
- 31 May/05 seen alone without calf
- 19 Jun/05 seen alone without calf
- 23 Sep/05 no visual
- 2 Mar/06 seen in group of 11 without calf
- Died 13 May/06 at age 14-15 years, likely wolf predation
- 23 Aug/06 collar retrieved

Caribou #104 (Sat, died, non-predation)

- 29 Mar/04 collared
- 29 May/04 seen in group of 3 without calf
- 3 Jun/04 seen in group of 3 without calf
- 22 Sep/04 no visual
- Died 13 Apr/05 age 11 years, a death related to malnutrition
- 4 May/05 collar retrieved

Caribou #103 (Sat, died)

- 1 Apr/04 collared
- 29 May/04 seen in group of 3 with calf

- 22 Sep/04 no visual
- Died 16 Apr/05 at age 5 years, likely wolf predation
- 4 May/05 collar retrieved

Caribou #102 (Sat, died)

- 29 Mar/04 collared
- Died 5 May/04, wolf predation
- 3 Jun/04 collar retrieved

Caribou # 101 (Sat, died)

- 30 Mar/04 collared
- Died 5 May/04 at age 14 years, likely wolf predation
- 9 Aug/04 collar retrieved

Caribou # 100 (Sat, no Sat or VHF active)

- 29 Mar/04 collared
- 29 May/04 seen in group of 3 without calf
- 3 Jun/04 seen alone without calf
- 22 Sep/04 no visual
- 25 Jan/05 seen in group of 11, without calf
- 31 May/05 seen in group of 3 with calf
- 19 Jun/05 seen alone without calf
- 23 Sep/05 problems with VHF transmission
- 30 Oct/06 problems with satellite transmission
- 6 Feb/06 no satellite/VHF signal
- 27 Feb/07 no visual
- 30 May/07 no visual
- 15 Jun/07 satellite transmission cease