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**BC Boreal Caribou Implementation Plan:
Year III (2014-2015) Field Activities Progress Report**



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Prepared for
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EXECUTIVE SUMMARY

The boreal ecotype of woodland caribou (*hereafter*, boreal caribou) is listed as *Threatened* (Nov 2014) by the Committee on the Status of Endangered Wildlife in Canada and is on the provincial Red-list in British Columbia. The *Implementation Plan for the Ongoing Management of Boreal Caribou (Rangifer tarandus caribou pop. 14) in British Columbia* (BCIP; MOE 2011) addresses provincial commitments to manage boreal caribou within the province. As a component of the BCIP, 224 adult boreal caribou were radio-collared in British Columbia's boreal caribou ranges between December 17, 2012 and April 1, 2015. Throughout this period, the fate of all radio-collared caribou within BC's boreal caribou ranges was monitored to track adult survival, with calf recruitment to 10 months estimated based on annual late winter composition surveys. This report summarizes field activities conducted in Year III of the program (May 1, 2014 to April 30, 2015).

Year III field activities included monthly fixed-wing telemetry monitoring flights and mortality site investigations, a late winter recruitment survey, and the deployment of additional radio-collars to maintain the sample of collared caribou and wolves.

Between December 8, 2014, and April 1, 2015, 35 GPS radio-collars (34 new Vectronic Vertex GS and 1 recycled Lotek LifeCycle) were deployed on 36 individual boreal caribou, including 16 recaptured to replace collars nearing the end of their battery life and 20 new animals. Thirteen new wolf collars (9 GPS, 4 VHF) were deployed on behalf of SCEK/FLNRO¹.

At the beginning of Year III (May 1, 2014), a total of 163 radio-collared caribou were potentially active in BC's boreal caribou ranges, including 157 SCEK-collared caribou, 4 animals previously collared by the BC Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO), and 2 collared by Alberta Environment and Sustainable Resource Development (AESRD). Twenty-three SCEK-collared caribou mortalities were detected and investigated between May 1, 2014 and April 30, 2015, including 4 animals originally collared by MFLNRO. With the exception of 1 accidental death, all collared caribou mortalities investigated in Year III were confirmed to be due to predation, including 20 cases of confirmed wolf predation, 1 case of undetermined predation (wolf suspected), and 1 case of wolverine predation. The

¹ An additional 7 GPS wolf collars were deployed in, and adjacent to, the Calendar, Snake-Sahtaneh, and Maxhamish ranges to support associated research being conducted by Nexen Inc.

majority of caribou deaths occurred in late winter and spring. The standardized annual finite survival rate for 181 adult females during the 12 month period between May 2014 and April 2015 was 0.86 ± 0.03 SE (95% C.I.= 0.81 to 0.91).

Late winter recruitment surveys were conducted on all herds between March 23 and April 1, 2015. A total of 678 boreal caribou (454F, 144M, 67 calves, 13 unclassified) were observed in 127 groups, including 14 unmarked groups located incidentally. Mean group size was 5.3 ± 3.1 SD (range 1 to 13). Overall calf recruitment to 10 months was 15 calves:100 cows, with calves comprising 10% of the minimum population counted.

Thirty-three of 36 caribou captured the previous winter (February-March 2014) and known to be pregnant, based on serum progesterone analysis, were alive and located during the March 2015 survey. Two animals successfully raised a calf to ten months of age, with the calf status of a third caribou undetermined.

Serum progesterone analysis indicated 35 of 36 (97%) adult female caribou captured between December 8, 2014 and April 1, 2015 were pregnant.

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1 INTRODUCTION

The British Columbia population of boreal ecotype woodland caribou (population #14; Designatable Unit DU8) is red-listed by the Province and designated as *Threatened* under the federal *Species at Risk Act* (COSEWIC 2011, Environment Canada 2011). In 2010, the *Implementation Plan for the Ongoing Management of Boreal Caribou (Rangifer tarandus caribou pop. 14) in British Columbia* (BCIP) was prepared to address provincial commitments to manage and/or recover species at risk under the *Accord for the Protection of Species at Risk in Canada* and the *Canada-British Columbia Agreement on Species at Risk* (MOE 2011). The BCIP outlines several objectives to allow long-term (50 years) recovery of boreal caribou populations, including: protecting and restoring habitat, managing the industrial footprint, establishing industry standard management practices, as well as mitigating effects of the industrial footprint by reducing predators and managing habitat conditions through fire suppression. These objectives are designed to provide measurable targets for action and evaluation to ensure population and distribution goals are being achieved.

As a component of the BCIP, 224 adult caribou (223F, 1M) were radio-collared in British Columbia's boreal caribou ranges between December 2012 and April 2015. Throughout Year III (May 1, 2014 to April 30, 2015), the fate of these animals, as well as boreal caribou previously collared by the BC Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) and Alberta Ministry of Environment and Sustainable Resource Development (AESRD), was monitored to track adult survival and calf recruitment.

This report summarizes program field activities conducted between May 1, 2014 and April 30, 2015 (Year III), including monthly fixed-wing telemetry monitoring flights and mortality site investigations, the maintenance of the sample of radio-collared caribou and wolves through the deployment of new collars, and a late winter recruitment survey.

2 METHODS

2.1 Study Area

Boreal caribou occur in the northeastern portion of British Columbia, in an area bounded by the Northwest Territories (NT) border (N60° latitude) to the north, the Alberta (AB) border (W120°

longitude) to the east, the northern Rocky Mountain foothills to the west (roughly W124°), and the northern limit of the agricultural zone to the south (roughly N57°; Fig. 1). Six boreal caribou ranges are currently delineated within BC, including the Chinchaga (CHIN), Snake-Sahtaneh (SNS), Calendar (CLN), Maxhamish (MAX), Prophet (PPH), and Parker (PRK) ranges, encompassing 16 associated core habitats² (MOE 2010). SCEK telemetry data and survey observations collected between December 2012 and April 2015 confirm the importance of an additional area of habitat identified as an area of interest by Culling *et al.* (2004) during the original range delineation process (*hereafter*, *Fort Nelson Core* (FN)).

The Chinchaga Range lies within the Boreal Plains (BOP) ecoprovince, with the remaining BC boreal ranges in the Taiga Plains (TAP) ecoprovince. All ranges are represented by the Boreal White and Black Spruce (BWBS) biogeoclimatic zone. The BC ranges are drained by several major tributaries of the Peace and Liard rivers, including the Beatton, Chinchaga, Fontas, Sikanni Chief, Fort Nelson, and Petitot rivers.

The establishment of *Resource Review Areas* (RRA) is one of several policy tools developed to support the management of BC's boreal caribou populations. In June 2010, 4 RRAs were established, including RRA-A, in the northwestern portion of the Chinchaga Range, RRA-B, which overlaps portions of the Prophet Range, and RRA-C and RRA-D, in the western and eastern portions of the Calendar Range, respectively (Fig. 2). For the field component of this project, the Chinchaga RRA (RRA-A) is typically treated as a separate entity from the Chinchaga Range as it is relatively remote from the main areas of caribou activity in the Milligan and Etthithun cores and is accessed via helicopter from Fort Nelson. A minimum 5-year moratorium on issuing new oil and gas tenures within RRAs was established in 2010, with the effectiveness of the measure to be assessed in 2015.

2.2 Telemetry Monitoring and Mortality Site Investigations

We conducted monthly fixed-wing telemetry monitoring flights throughout Year III to determine the approximate location and VHF beacon status of all boreal caribou and wolf collars believed to be active in the study area, including caribou collars deployed on behalf of SCEK, caribou and wolf collars deployed on behalf of MFLNRO, and collars known to have entered BC's boreal caribou ranges from adjacent jurisdictions. In late winter (February-March 2015), we conducted telemetry monitoring in conjunction with collar deployment sessions and the annual late winter recruitment survey.

²16 core habitats include Calendar, Prophet and Parker, which are considered both ranges and core areas.

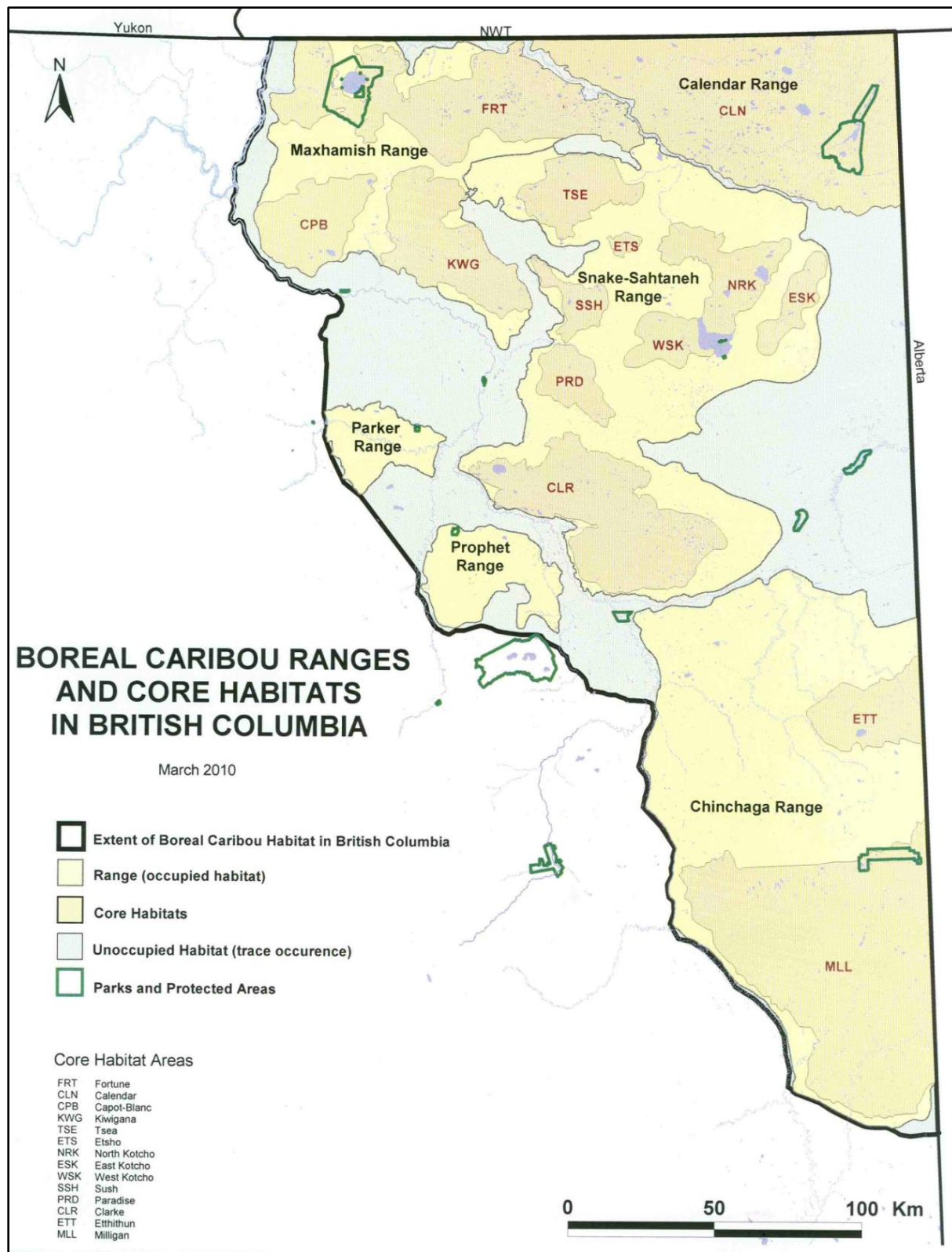


Figure 1. Boreal caribou ranges and core habitats in British Columbia (from MOE 2010).

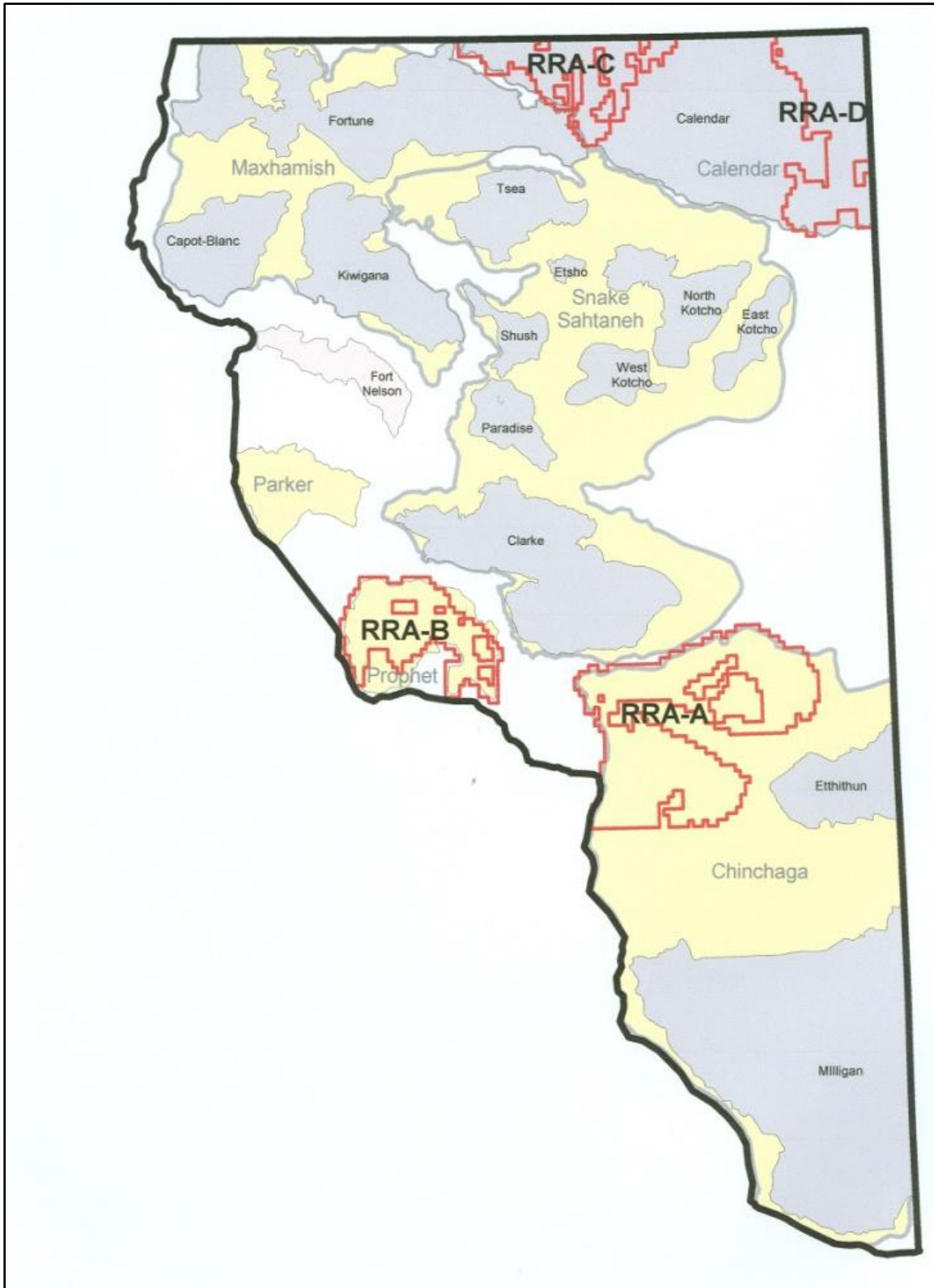


Figure 2. Location of 4 boreal caribou Resource Review Areas (RRA) established in 2010 in boreal caribou ranges, northeastern British Columbia.

We conducted telemetry flights using a Cessna 180 fixed-wing aircraft equipped with 1 outward-facing directional antenna affixed to each wing strut. We scanned all radio-collar frequencies using either a Lotek™ STR 1000 or Lotek™ BioTracker telemetry receiver. Flights were conducted at 700-1,000 m above ground level at an average speed of 160 km/hr. During the flight, we recorded the VHF beacon status of all detected collars on hard copy forms, which were later entered into an Excel database. We recorded the status of VHF collars (Lotek LMRT4) as either normal (60 pulses per minute (ppm)) or mortality mode (120 ppm) and obtained an approximate location (+/- 1 km) using a hand-held GPS unit. For GPS/satellite collars (ATS Iridium, Vectronic Vertex, and Lotek LifeCycle), we recorded VHF mortality mode and additional diagnostic VHF beacon patterns when applicable (i.e., low battery, last fix success, etc.). As GPS/satellite collars are programmed to log multiple daily locations with high precision, we did not attempt to obtain collar locations from the aircraft unless the VHF beacon status indicated a collar malfunction or mortality. For GPS/satellite collars transmitting normal VHF beacons we recorded a waypoint at the location from which the collar was heard and estimated a direction and distance correction from the flight path.

We conducted ground-based site investigations as soon as possible following detection of a caribou mortality event through VHF signal status or transmitted GPS/satellite data. We determined the cause and approximate date of death, collected biological samples, and recovered the collar. At each mortality site, we recorded animal ID, collar frequency, collar condition, GPS coordinates, photodocumentation, condition of remains, broad habitat type, and any observations relevant to suspected cause of death. Where available, and when the stage of decomposition allowed, we collected biological samples (e.g., long bones, lower jaw, tissue samples, and internal organs). Predator scat samples were collected from mortality sites and sent to the Provincial Wildlife Veterinarian. We assigned sequential mortality investigation numbers based on the date of detection, not the date of the ground investigation.

We estimated standardized annual adult survival rates for caribou using the Kaplan-Meier method staggered entry design, with standard error calculated using Greenwood's formula (Pollock *et al.* 1989; Krebs 1999, Krebs 2003).

Upon detection of a wolf mortality, we retrieved the radio-collar and attempted to determine cause of death. As determining the cause of death of collared wolves was not a budget priority, in months where

only wolf mortalities were detected, we deferred the site visit and collar retrieval until the next caribou mortality detection.

2.3 Capture and Collar Deployment

We based caribou and wolf capture operations out of the Fort St. John airport for the Milligan and Etthithun Cores of the Chinchaga Range and from the Fort Nelson airport for the Chinchaga RRA and all other ranges.

2.3.1 Caribou Capture

We focused Year III collar deployment effort on recapturing caribou to replace existing GPS radio-collars nearing the end of their 2-year battery life, as well as ensuring an adequate sample size of collars in the Fortune and Clarke cores and the Chinchaga RRA to support associated multi-species research. As in Year II, we continued to look for opportunities to deploy collars in areas outside established cores or where there is little existing information on caribou use.

We complied with British Columbia Resources Inventory Committee guidelines (RIC 1998a, RIC 1998b) for all caribou and wolf capture and handling protocols. We captured adult boreal caribou using a hand-held net-gun fired from a Bell 206B Jet Ranger helicopter. We assigned a sequential identification number to each collared caribou in the field (e.g., SCEK001). An alphabetic suffix was added to existing animal ID numbers to identify SCEK-collared caribou recaptured for collar replacement (e.g., SCEK001B).

We fitted captured caribou with either a Vectronic Vertex Survey GlobalStar (Vectronic Aerospace, Berlin, Germany) or Lotek LifeCycle GlobalStar (Lotek Wireless Inc, New Market, ON) GPS/satellite collar. Vectronic collars were factory programmed to acquire GPS fixes every 13 hours and transmit VHF signals from 0700-1900 hours (GMT-7). Lotek LifeCycle collars were factory programmed to acquire GPS fixes every 12 hours and transmit VHF signals from sunrise to sunset. All GPS/satellite collars were equipped with motion sensitive mortality sensors designed to transmit a satellite alert message as well as activate a distinctive VHF pulse pattern.

We collected hair, fecal, and blood samples from all caribou captured in Year III, as well as nasal swabs from a subsample of animals. We measured caribou neck circumference, mandible length, and hind foot and metatarsal length. We marked captured caribou with multi-coloured, plastic ear tags to allow for subsequent identification in the event of recapture after collar detachment and to aid in

identification of individuals during aerial surveys. We assigned caribou to broad age classes based on body size, antler configuration, and incisor wear. We examined caribou for evidence of parasites, including winter tick (*Dermacentor albipictus*) larvae and adults, warble fly (*Hypoderma* sp.) larvae, and *Besnoitia tarandi* cysts, as well as other signs of disease or injury. We assessed the occurrence and extent of hair loss and breakage.

We separated blood serum by centrifuge and sent a 1.5 ml serum sample to Prairie Diagnostic Services (University of Saskatchewan, Saskatoon, SK) for serum progesterone analysis. We delivered the remainder of the blood serum and all other samples collected to Dr. Helen Schwantje (MFLNRO) and Dr. Bryan Macbeth (University of Calgary).

Dr. John Cook (National Council for Air and Stream Improvement, Forest & Range Sciences Lab (NCASI), La Grande, OR) accompanied the capture crew on 9 of 12 capture sessions to assess caribou condition using ultrasonography and body condition score.

2.3.2 Wolf Capture

We captured wolves by aerial darting from a Bell 206B Jet Ranger helicopter using 3 ml single-use darts loaded with 300 mg of Telazol™ (Fort Dodge Animal Health, Fort Dodge, IA). Darts were placed in large muscles of the neck, shoulder, or rump and wolves were hazed toward suitable helicopter landing sites prior to becoming immobile. We assigned a sequential identification number to each collared wolf (e.g., BW001).

We fitted captured wolves with either a Lotek Iridium TrackM GPS/satellite, Vectronic Vertex Survey Iridium, or Lotek LMRT3 VHF collar. Wolf GPS/satellite collars were programmed to acquire GPS fixes every 3 hours and were equipped with motion sensitive mortality sensors designed to transmit a satellite alert message as well as activate a distinctive VHF pulse pattern. GPS collars deployed in 2015 were also equipped with timer release mechanisms programmed to activate at either 85 or 104 weeks after deployment.

We assigned captured wolves to broad age classes, collected hair and blood samples, and measured neck circumference, body and total length, chest girth, and hind foot length.

2.4 Late Winter Recruitment Survey

We conducted late-winter composition surveys in all boreal caribou ranges to estimate annual calf recruitment. We used telemetry to locate all radio-collared caribou from a Bell 206B helicopter. We classified all caribou in each group by sex and age using criteria defined by the Resources Inventory Standards Committee (RIC 2002), including adult females (>1 year), adult males (>1 year), calves, and mature males. We reduced helicopter disturbance (i.e., approach distance) to caribou groups by using image-stabilizing binoculars to classify animals and identify individual caribou by ear tag colour combination. We augmented the sample of SCEK and MFLNRO collars by locating and classifying groups associated with radio-collared animals from adjacent jurisdictions found within the BC search area and included incidental sightings of unmarked caribou groups. Recruitment was expressed as the number of calves alive at 10 months of age per 100 females and as the percentage of calves in the population.

3 RESULTS

3.1 Telemetry Monitoring and Mortality Site Investigations

3.1.1 Caribou

On May 1, 2014, 163 radio-collared caribou were potentially active within BC's boreal caribou ranges, including 157 SCEK caribou, 4 MFLNRO caribou, and 2 AESRD caribou. Twenty-three caribou mortalities were detected and investigated during the May 1, 2014 to April 30, 2015 monitoring period (Table 1), including 2 mortalities that occurred in April 2014 but were not detected until May and 3 mortalities discovered during the 2015 late winter recruitment survey. Nineteen of the 23 were original SCEK-collared animals and 4 were first collared in February 2011 by MFLNRO, then recaptured between December 2012 and January 2013 to replace aging ATS Iridium collars (SCEK003/BC1051, SCEK006/BC1053, SCEK013/BC1042, SCEK043/BC1043).

With the exception of SCEK207, all collared caribou mortalities investigated in Year III were confirmed to be from predation, including 20 cases of confirmed wolf predation, 1 case of undetermined predation (wolf suspected), and 1 case of wolverine predation. The majority of caribou deaths occurred in late winter and spring. No caribou predation mortalities occurred from December 2014 through February 2015 (Fig. 3). Fortune caribou SCEK207 died of strangulation in February 2014, when an antler from a second caribou became entangled in its collar webbing.

Table 1. Distribution of SCEK radio-collared caribou mortalities during Year III¹ (May 1, 2014 to April 30, 2015) by range and core area ($n=23$).

Core	Range								Total
	Chinchaga	Chinchaga RRA	Snake-Sahtaneh	Calendar	Maxhamish	Prophet	Parker	Fort Nelson	
Milligan	5								5
CHIN RRA		3							3
West Kotcho-Paradise ²			1						1
North Kotcho			3						3
Tsea			1						1
Calendar				2					2
Kiwigana					2				2
Fortune					2				2
Parker							1		1
Prophet						3			3
Total	5	3	5	2	4	3	1	0	23

¹ Two mortalities occurred in April 2014, but were not detected until May 2014 (SCEK046, ATS Iridium; and SCEK104 Vectronic Vertex)

² Caribou died between West Kotcho and Paradise cores

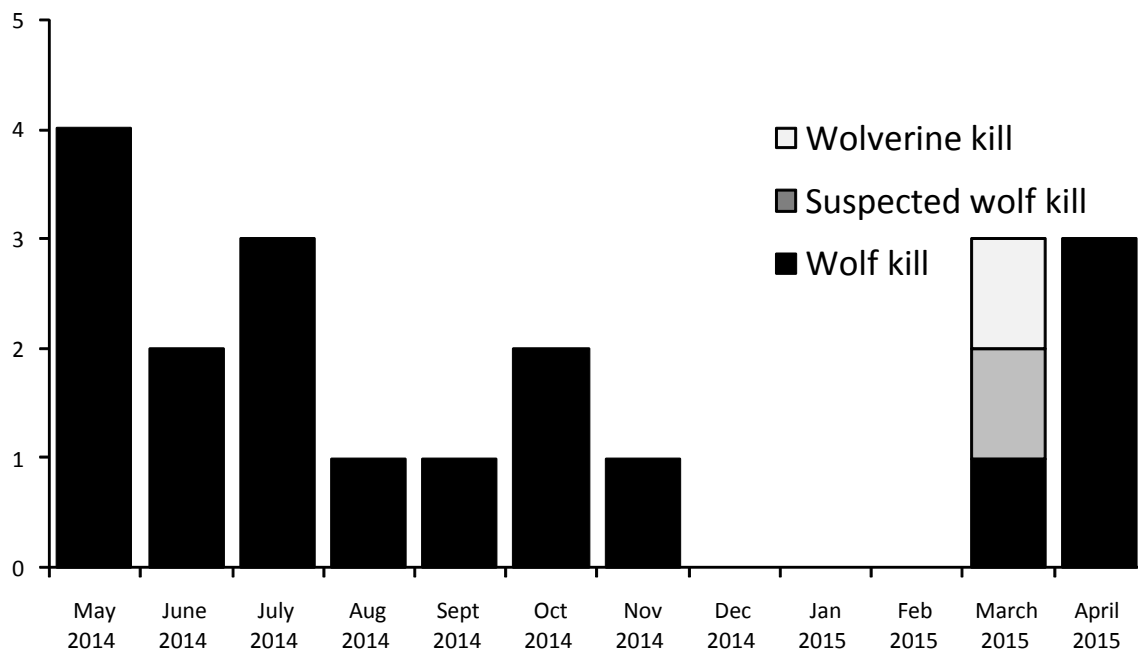


Figure 3. Source of SCEK radio-collared caribou predation mortality by month for Year III, May 1, 2014 to April 30, 2015, northeast British Columbia ($n=20$).³

³Two wolf mortalities that occurred in April 2014 (Year II) but were not detected until May 2014 and 1 non-predation mortality excluded.

The standardized annual finite survival rate for 181 adult females during the 12 month period between May 2014 and April 2015 was 0.86 ± 0.03 SE (95% C.I.= 0.81 to 0.91).

In late fall 2014, several ATS Iridium caribou collars began transmitting VHF signal patterns indicating their release mechanisms had activated on low voltage conditions but were still on the animal. During the 2014-2015 capture season, efforts were made to capture and deploy new collars on these individuals, as well as other caribou with collars nearing the end of their expected battery life. Two ATS Iridium collars (SCEK038, Chinchaga; SCEK114, Calendar) released and dropped off prior to recapture. The collars were retrieved on Feb 27, 2015 and March 29, 2015, respectively.

Detailed results of Year III (May 1, 2014 to April 30, 2015) mortality investigations are found in mortality investigation summary reports No. 11 to 20 (DES 2014, DES 2015).

3.1.2 Wolves

Between December 2012 and April 2014, we captured and collared 31 individual wolves in BC boreal caribou ranges as part of the REMB/SCEK boreal caribou telemetry program. We monitored all collars remaining active at the end of Year II (April 30, 2014) throughout Year III (May 1, 2014 through April 30, 2015).

Of 26 collared wolves potentially active at the end of Year II (18 GPS, 8 VHF), 11 were confirmed to have died during the Year III monitoring period. These included 3 killed by hunters (BW003, BW018, BW025), 1 whose remains were found at a moose kill site (BW023), 1 suspected to have been killed by other wolves (BW001), and 1 suspected to have been hit by a vehicle (BW029). One mortality occurred near Fort Providence, NT and could not be investigated. The cause of death for the remaining 3 wolves could not be determined due to advanced state of decomposition.

Over the course of Year III, 12 wolf collars became untraceable due to normal battery life expiration, collar failure/wolf damage, or dispersal beyond the study area. At the end of Year III, 3 of the 26 collars active at the beginning of the year remained functional, including 2 VHF collars (BW002, BW026) and 1 GPS collar that had exceeded its expected battery life (BW014).

The status of all collared wolves, as of April 30, 2015, is presented in Appendix I.

3.2 Year III Capture and Collar Deployment

3.2.1 Caribou

We deployed 35 GPS radio-collars (34 new Vectronic Vertex GS, 1 recycled Lotek LifeCycle) on 36 individual boreal caribou during 12 capture sessions between December 8, 2014, and April 1, 2015 (Table 2; Appendix II). This included 16 caribou recaptured to replace collars nearing the end of their battery life and 20 new animals. Two caribou (SCEK009B/BC1055 and SCEK161B/BC1059) were captured and collared for the third time. SCEK207 (Fortune) was collared on December 8, 2014, but died accidentally 2 months later. The mortality was detected and investigated on February 25, 2015, and the Vertex collar redeployed on SCEK033B (Milligan) on February 27, 2015.

Table 2. SCEK boreal caribou GPS collar deployment by range and core, northeastern British Columbia, December 8, 2014 to April 1, 2015 ($n=36$).

Range	Core	Capture Session												Total Caribou
		8-Dec-2014	9-Dec-2014	10-Dec-2014	11-Dec-2014	12-Dec-2014	24-Feb-2015	25-Feb-2015	26-Feb-2015	27-Feb-2015	28-Mar-2015	31-Mar-2015	1-Apr-2015	
CHIN	Milligan									2			3	5
	Etthithun												1	1
	CHIN-RRR				4									4
SNS	Clarke			1			1		1			1		4
	West Kotcho		1						1					2
	North Kotcho		1			1								2
	East Kotcho					1								1
	Tsea							1						1
CAL	Calendar		1					1	1					3
MAX	Kiwigana			2										2
	Fortune	4									1			5
	Capot-Blanc							1						1
PPH	Prophet-OS				1							1		2
PRK	Parker						2							2
FN	Fort Nelson						1							1
Total Caribou		4	3	3	5	2	4	3	3	2	1	2	4	36

One caribou mortality occurred during winter 2014-2015 capture operations. Despite suitable snow cover and normal capture operations (i.e., no hard fall), the animal broke its neck and died instantly.

Caribou collar distribution by range and core, and helicopter search lines flown during the collar deployment period are shown in Figures 4 and 5, respectively. We searched for caribou in the Paradise, Etsho, and Shush cores several times during winter 2014-2015. No adult female caribou were found, however, a group of bulls was located in Paradise on one occasion. Older tracks indicated caribou activity in these cores in the late fall. SCEK209 was collared on Dec 9, 2014 in West Kotcho, but was located in a group of 9 caribou (5F, 4M) just to east of Paradise Core during the recruitment survey.

During the March 2015 recruitment survey, we located 3 groups, totalling 9 caribou (2F, 5M, 2 calves), in the Shekelie drainage, including Calendar caribou SCEK112 and SCEK113. No uncollared adult females were found.

Thirty-five of 36 individual adult female caribou collared during the winter 2014-2015 capture season were alive on April 30, 2015 (Appendix II).

On April 1, 2015, at the end of the winter 2014-2015 capture season, 158 radio-collared caribou (157F, 1M) were active within BC's boreal caribou ranges (Table 3). Three mortalities occurred during the month of April, leaving a total of 155 active collars at the end of Year III (154F, 1M).

Table 3. Comparison of the annual proportion of SCEK, MFLNRO, and AESRD radio-collared caribou active within BC boreal caribou ranges, 2013-2015, northeast British Columbia.

Date	SCEK Collars				MFLNRO		AESRM Collars	Total SCEK	Total All Sources
	ATS Iridium	Vectronic Vertex	Lotek Lifecycle	Lotek VHF	ATS Iridium	Lotek VHF	Lotek VHF		
May 1, 2013	31	15	0	112	1	11	5	158	175
May 1, 2014	29	34	12	82	0	4	2	157	163
April 1, 2015 ^{1,2}	7	63	12	71	0	3	2	153	158
May 1, 2015 ³	7	61	12	70	0	3	2	150	155

¹ End of 2015 late winter recruitment survey and 2014-2015 capture sessions

² 7 Vectronic Vertex collars were deployed between March 28 and April 1, 2015

³ 3 SCEK-collared caribou mortalities occurred in April 2015, including 2 Vectronic Vertex and 1 Lotec VHF

By late winter the majority of boreal caribou captured showed some evidence of rubbing and hair loss associated with winter tick parasitism. Adult ticks were observed on 14 of 36 caribou captured. Warble fly larvae were observed on 4 caribou captured in late winter.

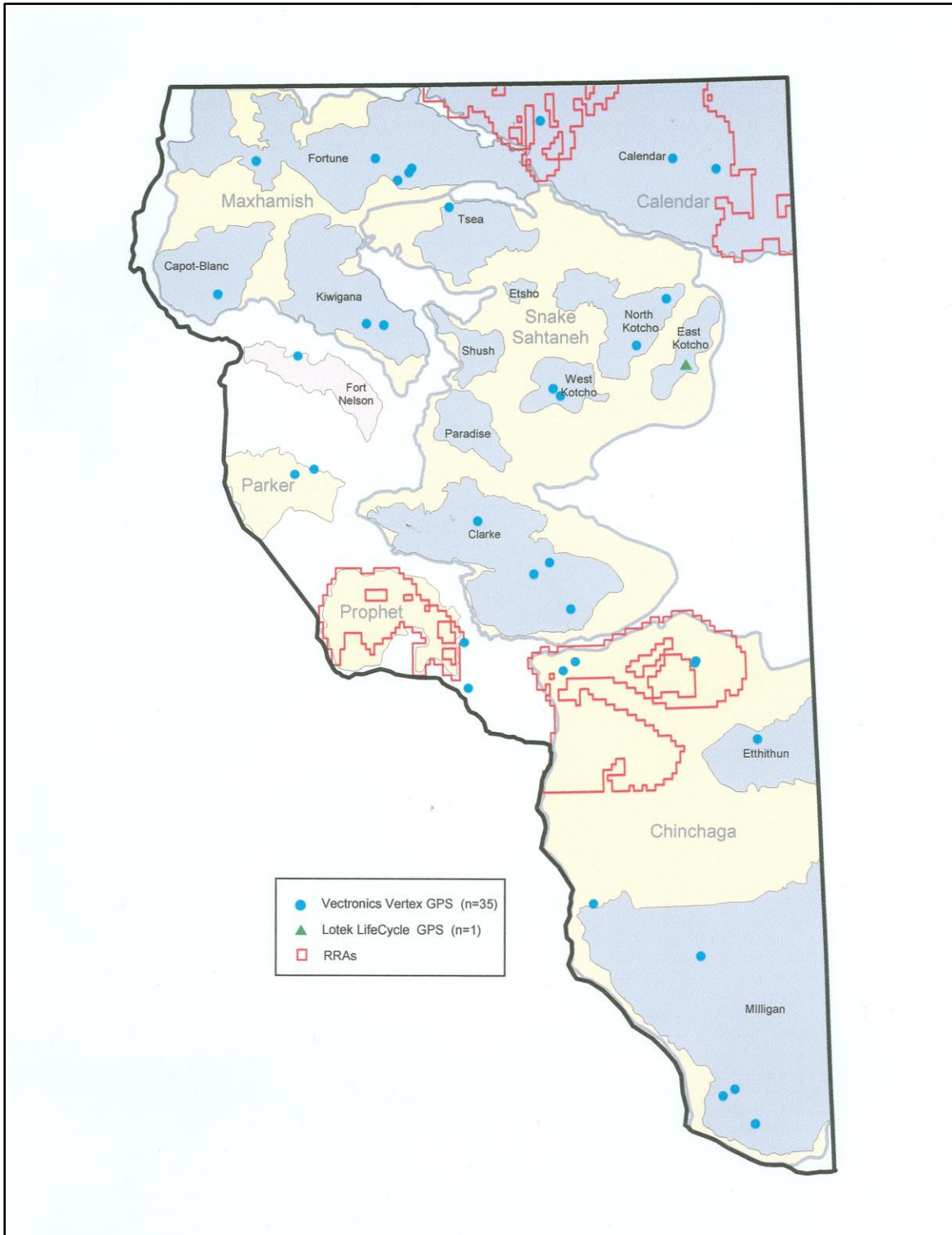


Figure 4. Location of capture and GPS radio-collar deployment for 36 boreal caribou in northeastern British Columbia, December 8, 2014 to April 1, 2015.

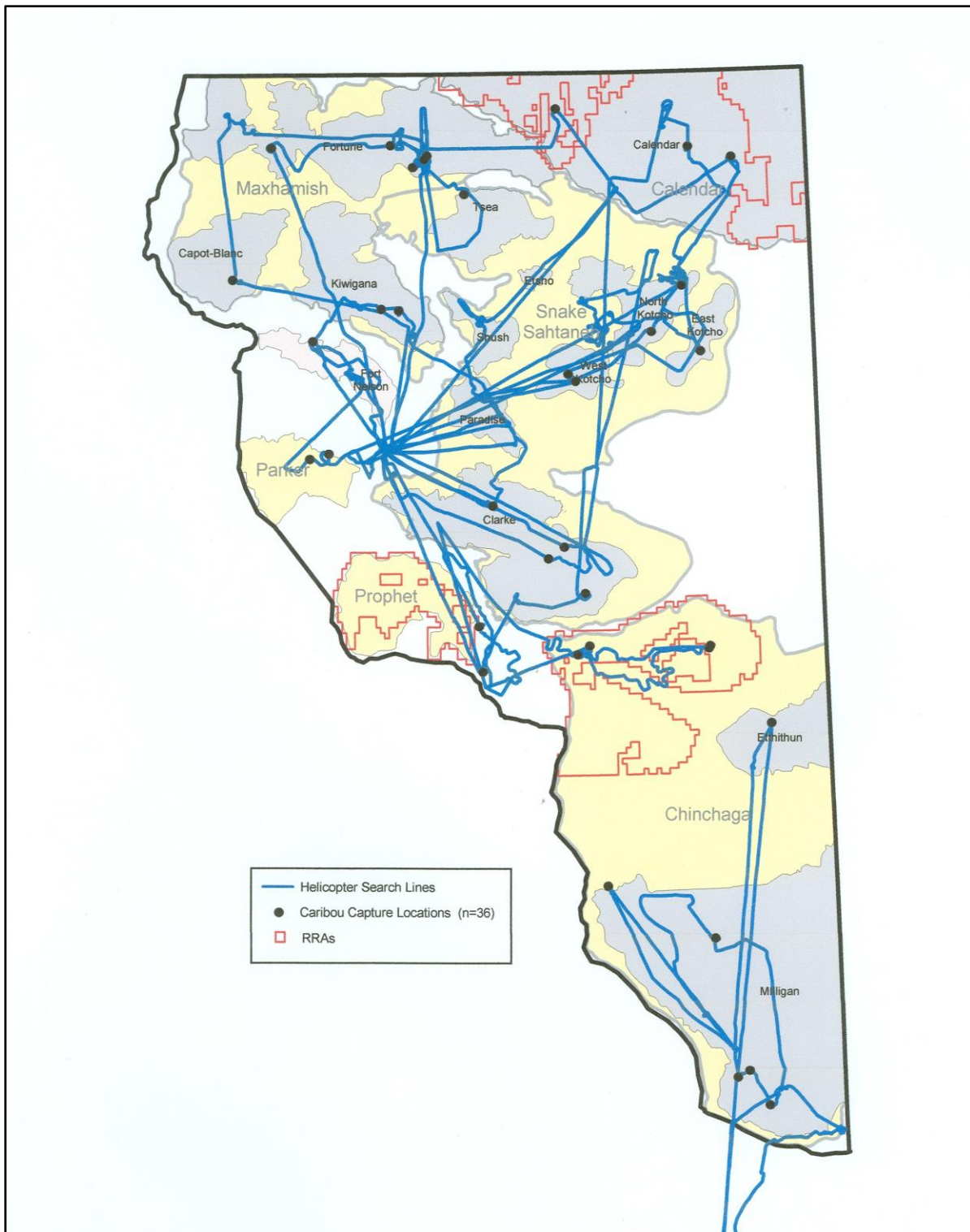


Figure 5. Helicopter search lines flown during deployment of GPS radio-collars on 36 boreal caribou in northeastern British Columbia, December 8, 2014 to April 1, 2015.

Serum progesterone analysis indicated 35 of 36 (97%) adult female caribou captured between December 8, 2014 and April 1, 2015 were pregnant (Appendix III). John Cook (NCASI) used ultrasonography to assess caribou body condition for 29 of 36 caribou captured in the winter of 2014-2015; results are presented in Cook and Cook (*in prep*).

3.1.2 Wolves

Wolf collaring efforts during Year III were hampered by delays in capture permit approval and radio-collar delivery, as well as the absence of favourable tracking conditions after permit approval.

We deployed 13 wolf collars (9 GPS, 4 VHF) within selected boreal caribou cores between February and April 2015 (Appendix IV). We focused wolf capture effort on the Fortune and Clarke Cores and the Chinchaga RRA, which correspond to the newly initiated SCEK/UNBC boreal moose study areas. We captured and collared members of 2 unmarked packs in the Fortune Core and 1 unmarked pack in the Clarke Core (Fortune, Petitot, and Elleh packs, respectively). Despite relatively high wolf densities indicated by a SCEK-funded wolf track transect survey (R. Serrouya, pers. comm.), our attempts to capture wolves in the Chinchaga RRA were unsuccessful due to poor capture conditions associated with lack of fresh snow and frequent midwinter freeze/thaw cycles.

We identified 1 new pack in the Calendar Core (July Pack) and deployed 1 VHF collar. We collared 2 new wolves in the Tsimeh Pack prior to battery failure of the last remaining active collar.

In addition to the 13 wolves collared as part of the BCIP program, we deployed 7 GPS collar on wolves with territories encompassing portions of the Calendar Range and the Fortune and Tsea cores (BW042 to BW047 and BW049) for Nexen Inc.

3.3 Caribou Late Winter Recruitment Survey

We conducted late winter recruitment surveys on all herds between March 23 and April 1, 2015 (Appendices V to XII). Daily weather conditions and visibility were good throughout the survey. Daytime temperatures varied considerably both over the course of the survey and within individual survey days. The greatest daily temperature differential occurred on March 28, when the temperature ranged between -20°C at 09:00 hrs to +9°C at 15:00 hrs. Figure 6 shows helicopter flight lines flown and location of caribou groups encountered during the 2015 SCEK late winter recruitment survey.

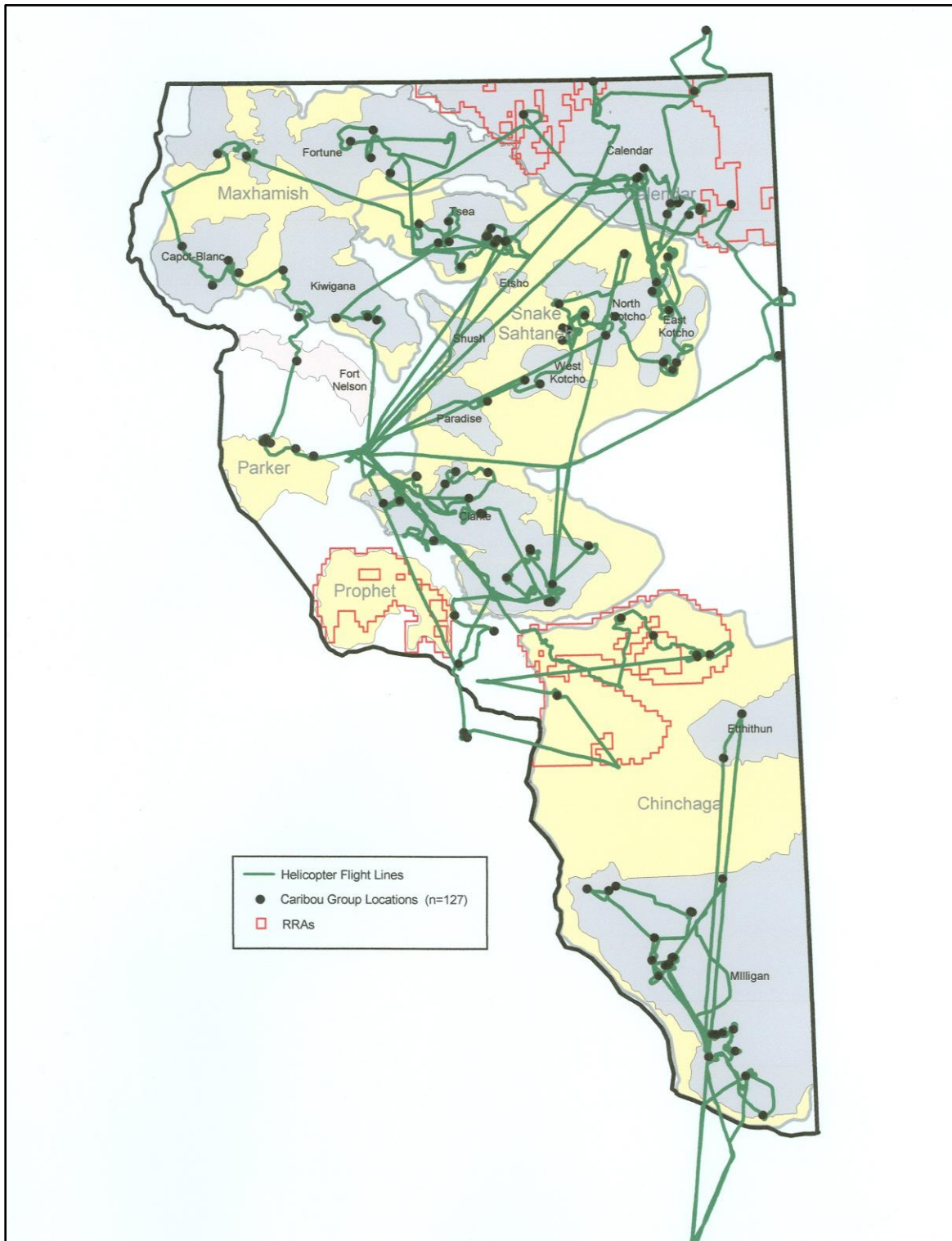


Figure 6. Location of boreal caribou groups and helicopter flight lines, SCEK late winter recruitment survey, northeastern British Columbia, March 23, 2015 to April 1, 2015.

One hundred fifty-eight caribou collars (152 SCEK, 4 FLNRO, 2 AESRD) were potentially active prior to the start of the 2015 recruitment survey, including 9 ATS Iridium, 57 Vectronic Vertex, 12 Lotek LifeCycle, 78 Lotek VHF, and 2 Alberta collars. We detected and investigated 3 collared caribou mortalities during the survey, including Milligan caribou SCEK030 and SCEK199 and Calendar caribou SCEK138. Three radio-collared caribou were not located, including 1 in the Chinchaga Range (AB149.391) and 2 in Calendar (SCEK184, SCEK125). Two ATS Iridium collars (SCEK038, Chinchaga; SCEK114, Calendar) released prior to the start of the survey. Therefore, a total of 150 radio-collared adult caribou (149F, 1M) actively contributed to the survey.

We observed 678 boreal caribou in 127 groups (Table 4), including 454 adult females, 144 adult males, 67 calves and 13 unclassified adults. Fourteen unmarked groups were located incidentally, including 3 in the Chinchaga Range (12 caribou), 6 in Snake-Sahtaneh (35 caribou), 4 in Calendar (12 caribou), and 1 in Parker (5 caribou). Mean group size was 5.4 ± 3.1 SD (range 1 to 13). Overall recruitment to 10 months was 15 calves:100 cows, with calves comprising 10% of the minimum population counted (Table 4). Table 5 presents total caribou observed and age-sex classification by range, core habitat, and RRA.

At the time of the 2015 recruitment survey, 9 SCEK caribou were located outside currently defined BC boreal caribou ranges (Table 5).

Thirty-three of 36 caribou captured the previous winter (February-March 2014) and known to be pregnant, based on serum progesterone analysis, were alive and located during the March 2015 survey. Two animals successfully raised a calf to ten months of age, with the calf status of a third undetermined.

Chinchaga Range

Twenty-eight collared caribou were potentially active in the Chinchaga Range prior to the start of the recruitment survey on March 23, 2015, including 26 SCEK and 2 AESRD collars. Two collars were transmitting mortality signals and a third collar was not found. Three Chinchaga caribou were recaptured to replace collars at the end of their battery life both prior to and during the survey. A total of 25 active collars contributed to the survey (23 Milligan, 2 Etthithun).

We surveyed the Milligan and Etthithun cores on March 23 and April 1, respectively. We counted 156 caribou in 24 groups in the 2 cores combined, including 3 uncollared groups encountered incidentally (Table 4, Table 5). Mean group size was 6.5 ± 4.0 SD (range 1-13), with a ratio of 9 calves:100 cows.

Table 4. SCEK late winter recruitment survey age-sex composition, calves per 100 cows, and group size by boreal caribou range, northeastern British Columbia, March 23 to April 1, 2015.

Range	Classification ¹					Total Caribou Observed	Calves:100 Cows	Total No. Groups	Min Group Size	Max Group Size	Mean Group Size (\pm SD)
	F	M	Cf	UA	MM ³						
Chinchaga	117	27	10	2	20	156	9 calves:100 cows	24	1	13	6.5 \pm 4.0
Chinchaga RRA	25	6	2	0	3	33	8 calves:100 cows	6	3	11	5.5 \pm 2.9
Snake-Sahtaneh	157	67	29	5	59	258	18 calves:100 cows	50	1	13	5.2 \pm 2.9
Calendar	55	14	12	0	12	81	22 calves:100 cows	18	2	11	4.5 \pm 2.3
Maxhamish	47	18	10	6	15	81	21 calves:100 cows	14	1	12	5.8 \pm 3.1
Prophet	21	0	0	0	0	21	0 calves:100 cows	6	1	8	3.5 \pm 2.4
Parker	25	12	2	0	5	39	8 calves:100 cows	7	2	13	5.6 \pm 3.6
Fort Nelson	7	0	2	0	0	9	n/a ³	2	2	7	n/a ³
Total	454	144	67	13	114	678	15 calves:100 cows	127	1	13	5.3 \pm 3.1

¹ F - Adult Females M - Adult Males Cf - Calves UA - Unclassified Adults MM - Mature Males

² Mature males defined as Class II or III bulls (RIC 2002)

³ Ranges with < 5 groups located or less than 10 caribou observed excluded

Table 5. Total caribou observed and age-sex classification by range, core habitat, and RRA, SCEK boreal caribou late winter recruitment survey, northeastern British Columbia, March 23 to April 1, 2015.

Range	Core/RRA	No. Active Collars	Total Caribou	Adult Females	Adult Males	Calves	Unclass	Mature Males
Chinchaga	Milligan	23 ^a	132	99	25	6	2	18
	Milligan Uncollared Grps (3)	n/a	12	9	1	2	0	1
	Etthithun	2	12	9	1	2	0	1
	Chinchaga RRA-A	10	33	25	6	2	0	3
	Chinchaga Total	35	189	142	33	12	2	23
Snake-Sahtaneh	Clarke	19	65	46	10	9	0	8
	Clarke - Outside	2	6	4	1	1	0	1
	Clarke Uncollared Grps (3)	n/a	19	6	10	3	0	9
	West Kotcho	3	7	6	0	1	0	0
	East Kotcho	2	7	6	1	0	0	1
	North Kotcho	4 ^b	11	9	1	1	0	1
	North Kotcho Uncollared Grp (1)	n/a	6	2	3	1	0	3
	Kotcho Cores - Outside	14	55	35	16	3	1	16
	Paradise - Outside	1 ^c	9	5	4	0	0	3
	Tsea	12 ^d	63	36	15	8	4	11
	Tsea - Uncollared Grps (2)	n/a	10	2	6	2	0	6
	Snake-Sahtaneh Total	57	258	157	67	29	5	59
Calendar	Calendar (excluding RRAs)	10 ^e	42	31	4	7	0	2
	Calendar Uncollared Grps (4)	n/a	9	7	0	2	0	0
	Calendar RRA-C	3	9	7	2	0	0	2
	Calendar RRA-D	1 ^f	7	3	3	1	0	3
	Calendar - Outside:							
	Shekelie (BC)	1	3	1	1	1	0	1
	Shekelie (BC) - Uncollared Grp (1)	n/a	3	0	3	0	0	3
	Shekelie (AB)	1	3	1	1	1	0	1
	Northwest Territories	1	5	5	0	0	0	0
	Calendar Total	17	81	55	14	12	0	12
Maxhamish	Capot-Blanc	5	16	11	3	2	0	3
	Fortune	13	34	23	5	6	0	5
	Kiwigana	7	31	13	10	2	6	7
	Maxhamish Total	25	81	47	18	10	6	15
Prophet	RRA-B	1	1	1	0	0	0	0
	Outside Range	3	7	7	0	0	0	0
	Outside BC Distrib	3	13	13	0	0	0	0
	Prophet Total	7	21	21	0	0	0	0
Parker	Parker	6 ^h	34	23	10	1	0	5
	Parker Uncollared Grp (1)	n/a	5	2	2	1	0	0
	Parker Total	6	39	25	12	2	0	5
Fort Nelson	Fort Nelson	2	7	6	0	1	0	0
	Fort Nelson - Outside	1	2	1	0	1	0	0
	Fort Nelson Total	3	9	7	0	2	0	0
Total		150	678	454	144	67	13	114

^a Milligan Core: 26 caribou assumed active prior to survey but 2 caribou mortalities detected during survey and 1 caribou not heard, leaving 23 active

^b SCEK135 was collared in Calendar, then moved to North Kotcho

^c SCEK209 was collared in West Kotcho on Dec 9, 2014; it was located in a group of 9 caribou just to east of Paradise during recruitment survey

^d 5 caribou were collared in Fortune, but moved to the Tsea Core prior to the March 2015 recruitment survey

^e 21 Calendar caribou assumed active prior to survey but 1 caribou mortality detected, 1 collar released, and 2 caribou not found, leaving 17 active

^f SCEK184 not heard since Sept 2014; SCEK125 moves between BC and NT (as far north as Trainor Lake)

^g A second collared caribou in RRA-D (SCEK138) was detected on mortality during the course of the Calendar survey

^h Parker caribou BC1001 not heard since spring 2014; collar battery assumed dead

We detected and investigated mortality signals for 2 VHF-collared caribou in the Milligan Core on March 23, 2015. Cause of death was undetermined predation (suspected wolf) and wolverine predation for SCEK030 and SCEK199, respectively.

Only 2 Alberta caribou collars were assumed active in the Chinchaga Range on March 23, 2015. We located AB150.470 in a group of 4 caribou (Chinchaga Grp #3), however, AB149.391 was not heard. We located an unidentified VHF-collared caribou with no ear tags in the Milligan Core (Chinchaga Grp #6), which was likely an AESRD-collared animal.

Chinchaga caribou SCEK042 was fitted with an ATS Iridium collar in the Milligan Core in January 2013, but the collar failed and stopped transmitting both GPS data and a VHF signal shortly after deployment. The caribou was last heard during the March 2013 recruitment survey. We observed an uncollared caribou with an ear tag matching SCEK042's (orange left) in the Milligan Core (Chinchaga Grp #11). As no other Milligan caribou fits that description, we assume the animal was SCEK042, whose collar had released prematurely at an unknown date in the previous two years.

An unmarked group of 3 caribou was located incidentally on March 23 in a cultivated field at PeeJay, in the Milligan Core (Chinchaga Grp #8), where approximately 50 caribou had been photographed the previous week (M. Watters, *pers. comm.*). At the time of the survey, the large group had dispersed, with only the 3 uncollared caribou remaining in the field. However, several smaller groups were located in the general area. On April 1, enroute to the Etthithun Core, we located a group of 6 caribou in the field and deployed a new Vertex collar (SCEK223).

Chinchaga RRA

We located all 10 SCEK caribou active in the Chinchaga RRA during the March 25, 2015 survey. We counted 33 caribou in 6 groups, including 25 adult females, 6 adult males, and 2 calves (Table 4, Table 5). We did not find any unmarked groups. Mean group size was 5.5 ± 2.9 SD (range 3-11), with a ratio of 8 calves:100 cows.

Snake-Sahtaneh Range

Five Snake-Sahtaneh caribou were recaptured to replace collars at the end of their battery life prior to and during the 2015 recruitment survey. Between March 26 and 31, 2015, we located all 57 SCEK-collared caribou (56F, 1M) active in the Snake-Sahtaneh Range. We counted 258 caribou in 50 groups, including 6 unmarked groups encountered incidentally (Table 4, Table 5). Mean group size was

5.2 ± 2.9 SD (range 1-13), with one group of 12 caribou in the Clarke Core containing 4 collared animals (SNS Grp #1). We calculated a ratio of 18 calves:100 cows.

During the survey, we located 5 caribou that had been collared in the Fortune Core of the Maxhamish Range but moved to the Tsea Core of the Snake-Sahtaneh Range during the winter of 2014-2015, including SCEK085, SCEK086, SCEK175, SCEK178, and SCEK179. We located the animals in 4 separate groups, totalling 25 caribou (13F, 8M, 4 calves). SCEK086 and SCEK086 had calves at heel. We found SCEK178 in a group of 7 caribou, including 2 unidentified VHF collars. One caribou had an older collar and no ear tags and the second had a red right ear tag (SNS Grp #27).

Seventeen radio-collared Snake-Sahtaneh caribou were located outside of defined cores during the survey, including 2 just outside Clarke, 1 outside Paradise, and 14 outside the 3 Kotcho cores.

Calendar Range

Between December 2014 and February 2015, 3 Calendar caribou were recaptured to replace ATS Iridium collars at the end of their battery life. Twenty-one SCEK-collared caribou were potentially active in the Calendar Range immediately prior to the start of the survey on March 28, 2015. One collar was transmitting a mortality signal, 2 caribou were not found, and 1 collar had released, therefore, a total of 17 collars actively contributed to the survey.

We counted 81 caribou in 18 groups, including 4 unmarked groups encountered incidentally (Table 4, Table 5). Mean group size was 4.5 ± 2.3 SD (range 2-11), with a ratio of 22 calves:100 cows.

We detected and investigated 1 Calendar caribou mortality during the survey. SCEK138 (VHF) was killed by wolves on a small lake in peatland habitat on the border of RRA-D.

We could not locate 2 Calendar caribou during the survey. SCEK184 was fitted with a refurbished ATS Iridium collar in March 2014, however, the collar malfunctioned and the caribou has not been heard since September 2014. SCEK125 moves between the Calendar Range and the Northwest Territories, as far north as Trainor Lake. To avoid potential helicopter disturbance to local First Nations land users, we did not attempt to locate the caribou assumed to be near Trainor Lake, NT.

Caribou SCEK135 was collared in the Calendar Range but moved to the North Kotcho Core of the Snake-Sahtaneh Range (SNS Grp #32). We located SCEK119, SCEK126B, and SCEK185 in 2 groups, totalling 9 caribou, in RRA-C and SCEK122 in a group of 7 in RRA-D. SCEK119 was found approximately 1 km from

the NT border; this caribou typically spends the summer north of the 60th Parallel. Three VHF-collared Calendar caribou were located outside the range boundaries, including SCEK107, who was in a group of 5 adult females, just north of the BC/NT border. We found SCEK113 in Alberta, at the headwaters of the Shekelie drainage, in a group of 3 animals (1F, 1M, 1cf) and SCEK112 in the BC portion of the Shekelie drainage, in a group of 3 animals (1F, 1M, 1cf). An unmarked group of 3 mature males was located a short distance from the latter group.

Maxhamish Range

In February 2015, 1 Maxhamish caribou was recaptured to replace an ATS Iridium collar at the end of its battery life. We located all 25 collared caribou potentially active in the Maxhamish Range during the March 27-28, 2015 survey, including 22 SCEK and 3 FNLRO collars. We counted 81 caribou in 14 groups (Table 4, Table 5). We did not encounter any unmarked groups. Mean group size was 5.8 ± 3.1 SD (range 1-12), with a ratio of 21 calves:100 cows.

In late winter 2015, prior to the March survey, several collared caribou moved between the Fortune Core of the Maxhamish Range and the Tsea Core of the Snake-Sahtaneh Range, including SCEK085, SCEK086, SCEK175, SCEK178, and SCEK179. SCEK087 was collared in the Fortune Core in February 2013, moved to the Tsea Core in February 2015, then returned to Fortune prior to the recruitment survey (MAX Grp #13).

Prophet Range

SCEK161B/ BC1059 was recaptured on March 31, 2015, following completion of the Prophet survey, to replace an ATS Iridium collar at the end of its battery life.

All 7 SCEK-collared caribou active within and adjacent to the Prophet Range in late winter 2015 were located during the March 25 survey. We counted a total of 21 adult female caribou in 6 groups, with no adult males or calves observed (0 calves:100 cows; Table 4, Table 5). Mean group size was 3.5 ± 2.4 SD (range 1-8).

None of the Prophet caribou were located within the currently-defined boundaries of the Prophet Range during the survey. We located 4 caribou in 3 groups, totalling 8 animals, outside the range but within the area encompassed by the BC boreal caribou distribution polygon (SCEK051, SCEK144, SCEK161, SCEK217). SCEK051 was outside the current Prophet Range polygon, but within the Prophet RRA. We located 3 VHF-collared Prophet caribou outside the area encompassed by the BC boreal caribou distribution, including SCEK045, SCEK049, and SCEK143.

Parker Range

Two Parker caribou were recaptured to replace collars at the end of their battery life in February 2015, prior to the recruitment survey. We located all 6 SCEK-collared caribou that were active in the Parker Range during the March 27 survey. A seventh animal, BC1001 (VHF), was last heard in spring 2014; the collar battery is now assumed dead. We counted 39 caribou in 7 groups within the range boundaries, including 1 unmarked group encountered incidentally (Table 4, Table 5). Mean group size was 5.6 ± 3.6 SD (range 2-13), with a ratio of 8 calves:100 cows.

Fort Nelson Core

In February 2014, prior to the recruitment survey, SCEK009B/BC1055 was recaptured to replace an aging ATS Iridium collar.

During the March 27, 2015 recruitment survey, we located all 3 radio-collared caribou assumed to be active in the Fort Nelson Core. SCEK009B/BC1055 and SCEK166 were found within the core boundaries. SCEK167 had left the core with her calf at heel, crossed the Fort Nelson River, and was located just outside the Maxhamish Range boundary (Fort Nelson Grp #2). Including SCEK167, we counted a total of 9 caribou in 2 groups of 7 and 2 caribou, respectively, within and adjacent to the Fort Nelson Core (Table 4, Table 5). We did not encounter any unmarked groups. Based on this small sample, recruitment to 10 months was 22 calves:100 cows, however, recruitment in ranges with less than 10 caribou observed was not formally estimated.

3.3.1 Incidental Observations

Incidental observations made during the March 23 to April 1, 2015 recruitment survey are found in Appendices V to XII.

A total of 19 moose were observed over the course of the survey. While evidence of moose use was observed throughout boreal caribou ranges (i.e., older tracks), daytime temperatures were sufficiently high to drive moose into areas of heavier forest cover with low sightability. One moose kill was observed in the Calendar Range (UTM 10.606059.6638305).

On March 28, we located an unmarked group of 2 adult male caribou and 1 bull calf in the Tsea Core (SNS Grp #31) within 500 m of the Petitot wolf pack. We saw 3 wolves, including BW032, BW033, and an uncollared animal, and heard BW034. On March 30, we observed 5 Petitot Pack wolves (BW032 and

4 uncollared animals) actively hunting a group of 6 caribou, including SCEK178, in the Tsea Core (10.575791.6596027).

4 DISCUSSION

Seventy-seven radio-collared boreal caribou deaths were investigated between the commencement of BCIP monitoring in December 2012 and the end of April 2015 (70 SCEK, 7 MFLNRO). Fifty mortalities were confirmed wolf kills (65%), with an additional 7 cases of suspected wolf kill, 3 wolverine kills, and one accidental death. Three caribou died of apparent poor condition in the first year of the study, following an extremely hard winter. Cause of death for the remaining 13 animals could not be determined. Figure 7 compares the cause of death of 75 radio-collared caribou mortalities investigated by season between January 2013 and April 2015.

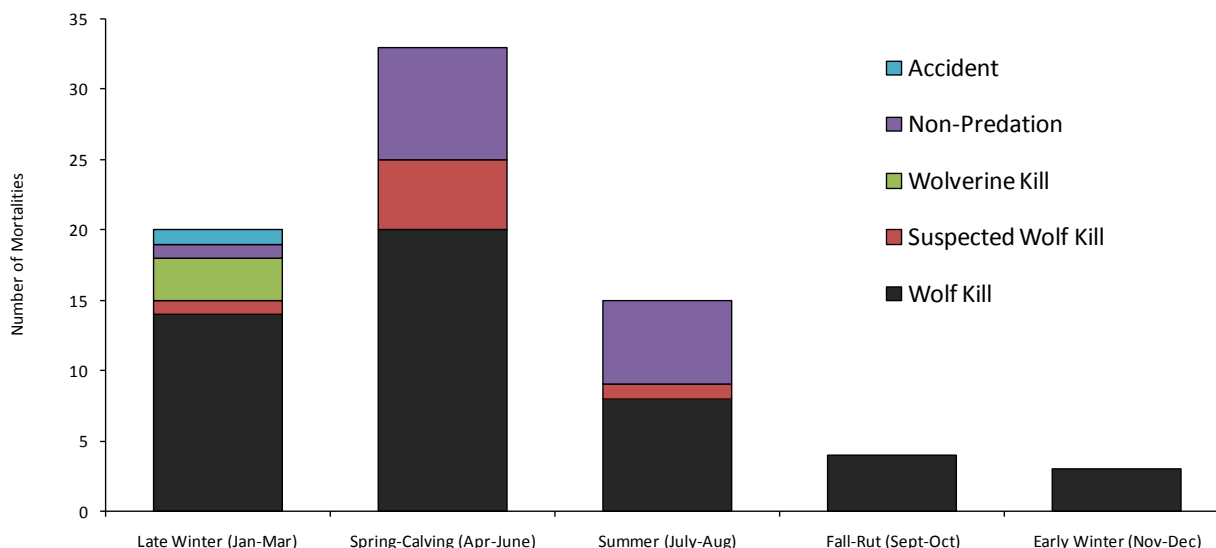


Figure 7. Cause of death of SCEK and BC FLNRO radio-collared boreal caribou by season⁴, January 1, 2013 to April 30, 2015, northeastern BC ($n=75$).

Figure 8 compares SCEK and BC FLNRO radio-collared boreal caribou mortality by year between January 1, 2013 and April 30, 2015.

⁴ Date of death for VHF collars is unknown, therefore we estimated mortality month based on the date of detection and the state of the carcass (i.e., decomposed or consumed).

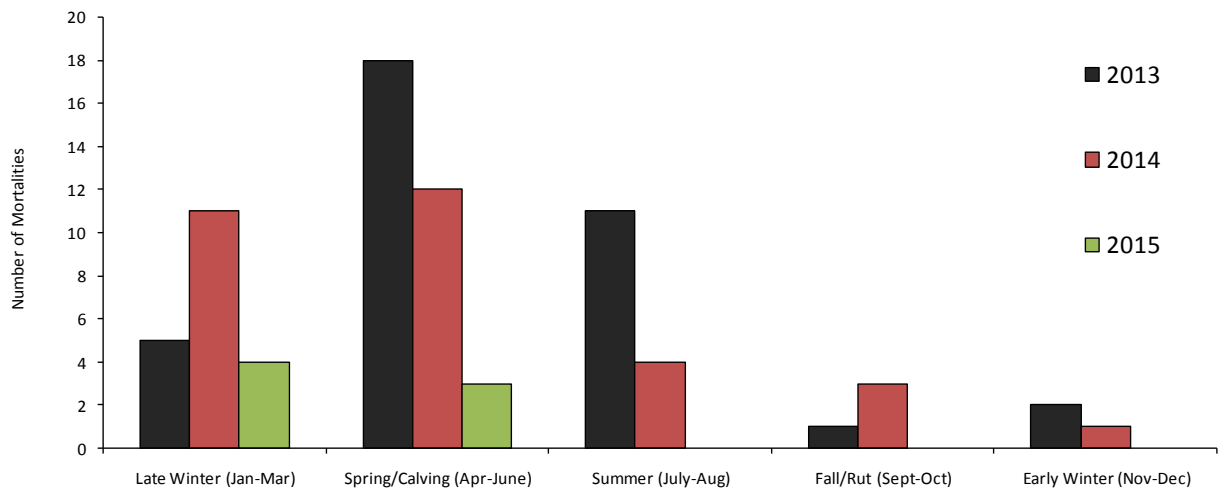


Figure 8. Comparison of SCEK and BC FLNRO radio-collared boreal caribou mortality by year, January 1, 2013 to April 30, 2015, northeastern BC ($n=75$).

The standardized annual adult female survival rate in Year III was 0.86 ± 0.03 SE (95% C.I.= 0.81 to 0.91). In comparison, annual adult female survival in Year II was 0.72 (95% CI 0.67 to 0.80; Culling and Culling 2014). Standardized annual adult survival for 57 females during the 58 month Snake-Sahtaneh study, ending in 2004, was estimated at 0.94 (95% CI 0.89 to 0.99; Culling *et al.* 2006).

A total of 224 individual boreal caribou have been captured since the commencement of the project, including 18 caribou captured multiple times. One capture mortality occurred in Year III. The overall capture mortality rate for the project is 0.04 %.

While sightability and snow conditions during the 2015 survey were slightly improved over 2014, absence of new snow and frequent freeze/thaw cycles made spotting of both marked and unmarked groups difficult due to lack of visible tracks and cratering and high ground contrast.

Environment Canada (2008) suggests 28 calves:100 cows recruitment is required for population stability, however high adult survival may partially offset low recruitment. Overall Year III calf recruitment to 10 months was 15 calves:100 cows, with calves comprising 10% of the population. Recruitment varied from 0 calves:100 cows in the Prophet Range to 22 calves:100 cows in the Calendar Range. Annual variability in recruitment was more pronounced in the smaller ranges and the Fort Nelson Core. Figure 9 compares calf recruitment between the 4 largest ranges and overall (i.e., all 7 ranges and the Fort Nelson Core combined), based on the March 2013, 2014, and 2015 surveys. Recruitment was lowest in

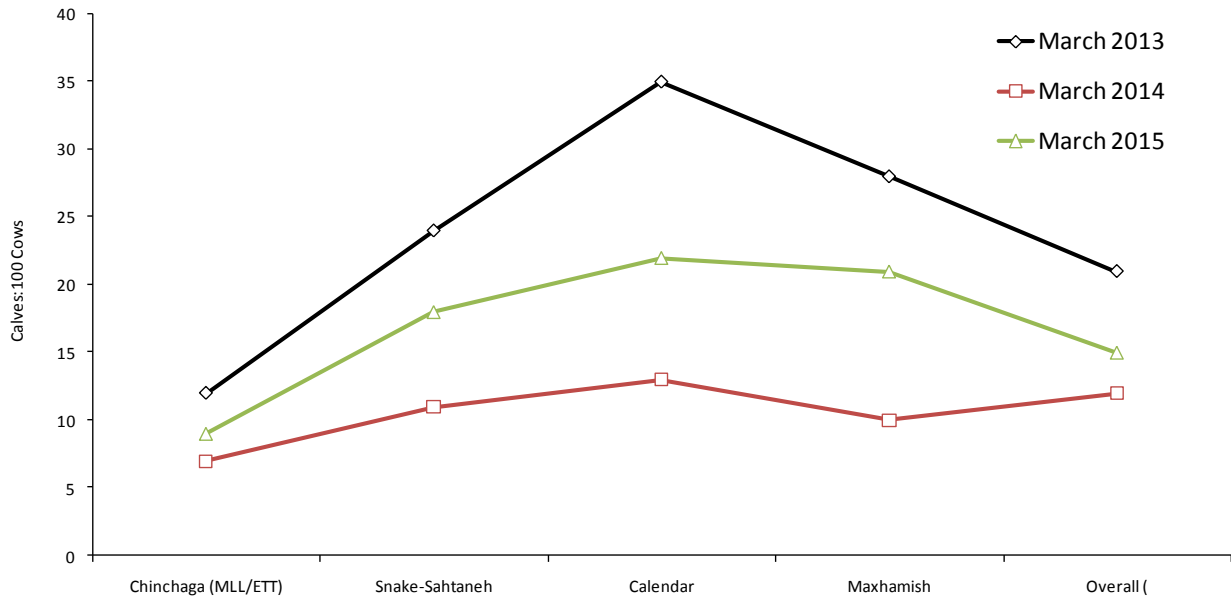


Figure 9. Comparison of annual calf recruitment (calves:100 cows) in the 4 largest boreal caribou ranges⁵ based on March 2013 through March 2015 SCEK late winter surveys, northeastern British Columbia.

March 2014, following a long, hard winter the previous year, when snow accumulation commenced in early October 2012 and persisted through April 2013.

A total of 155 radio-collared caribou (150 SCEK, 3 MFLNRO, 2 AESRD) were active within or adjacent to BC's boreal caribou ranges at the end of Year III (April 30, 2015), representing 23% of the minimum population count of 678 boreal caribou observed during the 2015 late winter recruitment survey (Appendix XIII). It is important to note that this does not represent the proportion of the population that is collared because the entire population is not observed during surveys.

4.1 Recommendations

Winter 2014-2015 capture activities were directed at recapturing caribou to replace collars at the end of their battery life and to ensure sufficient numbers of caribou were collared in the Clarke and Fortune cores and the Chinchaga RRA to support the objectives of a joint SCEK-University of Northern British Columbia research project. Future capture sessions should endeavour to rebalance the proportion of

⁵ Chinchaga Range includes Milligan and Etthithun cores combined; the Chinchaga RRA, Parker and Prophet ranges and the Fort Nelson Core were excluded.

collared caribou among cores. In particular, the sample of collared caribou in the Parker Core should be augmented.

We suggest deploying GPS/satellite collars on a limited sample of mature males to provide insight into movement between ranges and cores and to provide a more accurate minimum population count.

The Shekelie drainage appears to provide small pockets of suitable habitat, however, no uncollared adult female caribou were found in this area in late winter 2015. Direction from REMB indicates confirming the level of caribou use in this area is a priority objective. We held back 1 new Vectronic Vertex collar to provide the opportunity to deploy a GPS collar in the Shekelie drainage in late fall/early winter 2015. To reduce costs, capture sessions can be combined with mortality site investigations in either the Kotcho cores or Calendar Range. If uncollared adult female caribou are located in the Shekelie, it may be possible to deploy additional GPS collars using ones retrieved from mortality sites in 2015.

As found in previous years, the existing boundaries do not adequately represent the distribution and movements of Prophet caribou. Range and core boundaries are currently being amended, which will address this issue.

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APPENDICES

Appendix I: Status of wolves radio-collared in boreal caribou ranges in northeast British Columbia, to April 30, 2015.

Wolf ID	Pack	Core	Date Collared	Collar Type	Colour	Sex	Status	Comment
BW001	Tsimeh	FN	18-Dec-12	Lotek VHF	Grey	M	Mortality	Last heard Dec 23, 2014; recovered Feb 24, 2015; suspect intraspecific mortality
BW002	Big Arrow	MLL	21-Jan-13	Lotek VHF	Grey	M	Active	
BW003	West Clarke	CLR	25-Jan-13	Lotek Iridium	Light Grey	M	Mortality	No VHF detected since deployment; Iridium ceased Feb 09, 2013; hunter kill June 08, 2014
BW004	West Clarke	CLR	25-Jan-13	Lotek VHF	Black	M	Mortality	Reported found dead by public Sept 2013; collar turned in to Conservation Officers
BW005	Prophet	CLR-PPH	25-Jan-13	Lotek Iridium	Black	M	Mortality	Recovered Feb 23, 2014; killed by rival pack; collar redeployed on BW006
BW006	Snake	PRD	23-Feb-13	Lotek Iridium	Grey/Black	M	Mortality	Iridum ceased Mar 13, 2013; VHF mortality signal July 25, 2013, recovered July 28, 2013; decomposed
BW007	Snake	PRD	23-Feb-13	Lotek VHF	Grey/White	M	Unknown	VHF not detected since deployment; suspected dispersal
BW008	Tsimeh	FN	03-Mar-13	Lotek Iridium	Light Grey	M	Unknown	VHF last heard July 14, 2014; Iridium data ceased August 07, 2014
BW009	Tsimeh	FN	03-Mar-13	Lotek Iridium	Black	F	Unknown	Last data received Sept 27, 2014
BW010	Snake	PRD	03-Mar-13	Lotek Iridium	Black	M	Unknown	Last data received Aug 15, 2014; last location Arrowhead River, NT
BW011	Big Arrow	MLL	04-Mar-13	Lotek Iridium	Grey	F	Unknown	VHF last heard Aug 18 14; no Iridium function since deployment
BW012	Big Arrow	MLL	04-Mar-13	Lotek Iridium	Black	F	Unknown	No VHF since deployment; last data received Nov 21, 2014
BW013	West Clarke	CLR	04-Apr-13	Lotek Iridium	Light Grey	F	Mortality	Iridium data ceased Jun 30, 2013; recovered Nov 20, 2013 (collar only); suspect hunter kill
BW014	Tsimeh	FN	06-Apr-13	Lotek Iridium	Grey	M	Active	
BW015	Snake	PRD	06-Apr-13	Lotek Iridium	Light Grey	F	Mortality	Killed by moose Dec 12, 2013; recovered Dec 22, 2013
BW016	Snake	PRD	06-Apr-13	Lotek Iridium	White	F	Replaced	GPS collar failed Aug 15, 2013; recaptured to replace with VHF collar (BW016b)
BW016b	Snake	PRD	25-Jan-14	Lotek VHF	White	F	Mortality	Detected and recovered Aug 21, 2014; carcass decomposed

Wolf ID	Pack	Core	Date Collared	Collar Type	Colour	Sex	Status	Comment
BW017	Elleh	CLR	06-Apr-13	Lotek Iridium	Dark Grey	M	Unknown	VHF last heard June 07, 2014; Iridium data ceased Oct 17, 2013
BW018	Elleh	CLR	06-Apr-13	Lotek Iridium	Dark Grey	F	Mortality	Iridium data ceased Feb 07, 2014; hunter kill July 2014
BW019	Parker	PRK	07-Apr-13	Lotek Iridium	Grey	M	Unknown	VHF last heard June 07, 2014; Iridium data ceased June 25, 2014
BW020	Parker	PRK	07-Apr-13	Lotek VHF	Grey	M	Mortality	Recovered June 20, 2014; carcass decomposing but intact
BW021	Clarke	CLR	07-Apr-13	Lotek Iridium	Black	M	Unknown	VHF last heard June 07, 2014; Iridium data ceased June 30, 2014
BW022	Clarke	CLR	07-Apr-13	Lotek VHF	Black	F	Mortality	Recovered July 18, 2014; only hair and bone fragments remaining
BW023	Snake	PRD	07-Apr-13	Lotek VHF	Black	M	Mortality	Recovered May 17, 2014; fragmented wolf remains and hair at moose kill site
BW024	Kwokullie	NRK	20-Mar-14	Lotek Iridium	Grey	M	Unknown	Iridium data ceased Mar 01, 2105
BW025	Kwokullie	NRK	20-Mar-14	Vectronic	Grey	M	Mortality	Hunter kill Sept 2014
BW026	Kwokullie	NRK	20-Mar-14	Lotek VHF	Grey	F	Active	
BW027	Snake	PRD	31-Mar-14	Lotek Iridium	Black/Grey	M	Unknown	Iridium data ceased Jan 16, 2015
BW028	Snake	PRD	31-Mar-14	Lotek Iridium	Grey/Black	M	Mortality	Dispersal to Mackenzie River, NT; no movement since Sept 06, 2014 (assumed dead)
BW029	Clarke	CLR	01-Apr-14	Lotek Iridium	Grizzled Black	F	Mortality	Collar recovered from edge of RoW July 2, 2014, suspect hit by vehicle
BW030	Clarke	CLR	01-Apr-14	Lotek Iridium	Grey	F	Unknown	Iridium data ceased Dec 27, 2014; last location Fort Nelson townsite
BW031	Clarke	CLR	01-Apr-14	Lotek Iridium	Black/Grey	F	Mortality	Mortality detected Sept 14, 2014; collar recovered Sept 17, 2014
BW032	Petitot	FRT-TSE	8-Feb-15	Lotek VHF	Black	F	Active	
BW033	Petitot	FRT-TSE	8-Feb-15	Lotek Iridium	Grey	M	Active	

Wolf ID ¹	Pack	Core	Date Collared	Collar Type	Colour	Sex	Status	Comment
BW034	July	CLN	9-Feb-15	Lotek VHF	Black	M	Active	
BW035	Fortune	FRT	25-Feb-15	Lotek Iridium	Grey	M	Active	
BW036	Fortune	FRT	25-Feb-15	Lotek Iridium	Black	M	Active	
BW037	Fortune	FRT	25-Feb-15	Lotek VHF	Grey	F	Active	
BW038	Elleh	CLR	5-Mar-15	Vectronic	Black	F	Active	
BW039	Elleh	CLR	5-Mar-15	Lotek Iridium	Black	M	Active	
BW040	Elleh	CLR	26-Mar-15	Lotek Iridium	Black	M	Active	
BW041	Fortune	FRT	28-Mar-15	Lotek Iridium	Black	F	Active	
BW048	Tsimeh	FN	8-Apr-15	Lotek VHF	Black	M	Active	
BW050	Petitot	FRT-TSE	9-Apr-15	Lotek Iridium	Light Grey	F	Active	
BW051	Tsimeh	FN	9-Apr-15	Lotek Iridium	Grey	M	Active	

¹ Wolves BW042 through BW047 and BW049 collared for Nexen Inc.

Appendix II: SCEK boreal caribou capture data (abridged), December 8, 2014 to April 1, 2015

2014-15 Capture #	Caribou ID	Capture Event	Status April 30, 2015	S	Herd	Core	Date	Collar Make	Collar Model	Easting	Northing	Group Size	Calf at Heel	Comments
1	SCEK205	01	Active	F	MAX	FRT	8-Dec-14	Vectronic	Vertex GS	537504	6622702	14	Y	Grp included SCEK129
2	SCEK206	01	Active	F	MAX	FRT	8-Dec-14	Vectronic	Vertex GS	538417	6624116	10	N	
3	SCEK207	01	Mortality	F	MAX	FRT	8-Dec-14	Vectronic	Vertex GS	525890	6627574	4	N	Grp included BC1033; SCEK207 died Feb 15, 2015 - collar redeployed on SCEK033B on 27 Feb 2015 (Milligan Core)
4	SCEK208	01	Active	F	MAX	FRT	8-Dec-14	Vectronic	Vertex GS	485013	6626618	8	N	Grp included SCEK176
5	SCEK209	01	Active	F	SNS	WSK	9-Dec-14	Vectronic	Vertex GS	589694	6546337	2	N	
6	SCEK100B	02	Active	F	SNS	NRK	9-Dec-14	Vectronic	Vertex GS	615788	6563647	4	N	Recaptured to replace ATS Iridium
7	SCEK146B	02	Active	F	CLN	CLN	9-Dec-14	Vectronic	Vertex GS	643112	6624175	5	N	Grp included SCEK134; recaptured to replace ATS Iridium (collar not transmitting data for approx. 1 year, but still on double-beep may have logged fixes)
8	SCEK210	01	Active	F	MAX	KWG	10-Dec-14	Vectronic	Vertex GS	522817	6571037	4	Y	Grp included SCEK062
9	SCEK211	01	Active	F	MAX	KWG	10-Dec-14	Vectronic	Vertex GS	528817	6570511	4	N	
10	SCEK212	01	Active	F	SNS	CLK	10-Dec-14	Vectronic	Vertex GS	561195	6503304	4	Y	Lotek Lifecycle collar redeployed from mortality SCEK165/BC1023
11	SCEK213	01	Active	F	CHIN	CHIN-RRR	11-Dec-14	Vectronic	Vertex GS	636327	6455323	9	N	Grp included SCEK171 and new collar SCEK214
12	SCEK214	01	Active	F	CHIN	CHIN-RRR	11-Dec-14	Vectronic	Vertex GS	635904	6454469	9	N	Grp included SCEK171 and new collar SCEK213
13	SCEK215	01	Active	F	CHIN	CHIN-RRR	11-Dec-14	Vectronic	Vertex GS	590575	6451899	11	N	Grp included SCEK048 (with calf), SCEK142, and new collar SCEK216

2014-15 Capture #	Caribou ID	Capture Event	Status April 30, 2015	S	Herd	Core	Date	Collar Make	Collar Model	Easting	Northing	Group Size	Calf at Heel	Comments
14	SCEK216	01	Active	F	CHIN	CHIN-RRR	11-Dec-14	Vectronic	Vertex GS	594750	6455029	11	N	Grp included SCEK048, SCEK142, and new collar SCEK215
15	SCEK217	01	Active	F	PPH	PPH-OS	11-Dec-14	Vectronic	Vertex GS	556583	6461601	4	N	Grp included SCEK051/BC1060 and SCEK187
16	SCEK110B	02	Active	F	SNS	ETT	12-Dec-14	Lotek	LifeCycle	632755	6557031	2	N	Recaptured to replace ATS Iridium; Lotek Lifecycle collar redeployed from mortality SCEK190
17	SCEK097B	02	Active	F	SNS	NRK	12-Dec-14	Vectronic	Vertex GS	626111	6579619	4	N	Recaptured to replace ATS Iridium
18	SCEK016B	02	Active	F	PRK	PRK	24-Feb-15	Vectronic	Vertex GS	504874	6521032	5	N	Recaptured to replace ATS Iridium
19	SCEK014B	02	Active	F	PRK	PRK	24-Feb-15	Vectronic	Vertex GS	498296	6519242	4	N	Recaptured to replace ATS Iridium
20	SCEK009B/ BC1055	03	Active	F	FN	FN	24-Feb-15	Vectronic	Vertex GS	499266	6559824	8	N	Grp included SCEK166; recaptured to replace ATS
21	SCEK218	01	Active	F	SNS	CLK	24-Feb-15	Vectronic	Vertex GS	580501	6485169	8	N	Grp included SCEK152 (with calf)
22	SCEK007B	02	Active	F	MAX	CPB	25-Feb-15	Vectronic	Vertex GS	471857	6580950	4	N	Grp included SCEK076; recaptured to replace ATS Iridium
23	SCEK079B	02	Active	F	SNS	TSE	25-Feb-15	Vectronic	Vertex GS	551265	6610845	24	Y	Recaptured to replace ATS Iridium
24	SCEK126B	02	Active	F	CLN	CLN	25-Feb-15	Vectronic	Vertex GS	582633	6640469	8	N	Grp included SCEK185; recaptured to replace ATS Iridium

2014-15 Capture #	Caribou ID	Capture Event	Status April 30, 2015	S	Herd	Core	Date	Collar Make	Collar Model	Easting	Northing	Group Size	Calf at Heel	Comments
25	SCEK219	01	Active	F	SNS	WSK	26-Feb-15	Vectronic	Vertex GS	587117	6548801	4	Y	
26	SCEK136B	02	Active	F	CLN	CLN	26-Feb-15	Vectronic	Vertex GS	628248	6627664	2	Y	Recaptured to replace ATS Iridium
27	SCEK220	01	Active	F	SNS	CLK	26-Feb-15	Vectronic	Vertex GS	585876	6489182	4	Y	
28	SCEK033B	02	Active	F	CHIN	MLL	27-Feb-15	Vectronic	Vertex GS	638127	6354197	9	N	Recaptured to replace ATS Iridium; Vertex collar redeployed from Fortune mort SCEK207
29	SCEK036B	02	Active	F	CHIN	MLL	27-Feb-15	Vectronic	Vertex GS	601155	6371945	9	Und	Grp included SCEK060; recaptured to replace ATS Iridium
30	SCEK221	01	Active	F	MAX	FRT	28-Mar-15	Vectronic	Vertex GS	533541	6620008	8	Y	LW recruitment survey grp Maxhamish #14, includes SCEK205 and SCEK206
31	SCEK020B	02	Active	F	SNS	CLK	31-Mar-15	Vectronic	Vertex GS	593188	6473171	6	N	Grp included SCEK150; recaptured to replace ATS Iridium
32	SCEK161B/ BC1059	03	Active	F	PPH	PPH-OS	31-Mar-15	Vectronic	Vertex GS	557904	6445786	4	N	Recaptured to replace ATS Iridium
33	SCEK026B	02	Active	F	CHIN	MLL	01-Apr-15	Vectronic	Vertex GS	657062	6296755	2	N	Recaptured to replace ATS Iridium
34	SCEK222	01	Active	F	CHIN	MLL	01-Apr-15	Vectronic	Vertex GS	650048	6308693	7	N	Previously collared (purple right eartag)
35	SCEK223	01	Active	F	CHIN	MLL	01-Apr-15	Vectronic	Vertex GS	645962	6306334	6	N	In field at PeeJay
36	SCEK224	01	Active	F	CHIN	ETT	01-Apr-15	Vectronic	Vertex GS	657483	6428598	8	N	LW recruitment survey grp Chinchaga #24; grp includes SCEK040; Vertex collar redeployed from Milligan mort SCEK199

Appendix III: Pregnancy status of SCEK caribou captured between December 8, 2014 and April 1, 2015 ($n=36$).

Caribou ID	Herd	Core	Sample Date (dd/mm/yy)	Age Estimate	Calf at Heel	Progesterone (ng/ml)	Result
SCEK007B	MAX	CPB	25-Feb-15	6-8	N	6.7	Pregnant
SCEK009B	FN	FN	24-Feb-15	8-10	N	8.0	Pregnant
SCEK014B	PRK	PRK	24-Feb-15	6-8	N	7.9	Pregnant
SCEK016B	PRK	PRK	24-Feb-15	5-7	N	4.0	Pregnant
SCEK020B	SNS	CLR	31-Mar-15	6-8	N	10.0	Pregnant
SCEK026B	CHIN	MLL	01-Apr-15	6-8	N	4.6	Pregnant
SCEK033B	CHIN	MLL	27-Feb-15	5-7	N	5.4	Pregnant
SCEK036B	CHIN	MLL	27-Feb-15	6-8	Und	5.0	Pregnant
SCEK079B	SNS	TSE	25-Feb-15	4-6	Y	6.4	Pregnant
SCEK097B	SNS	NRK	12-Dec-14	5-7	N	4.7	Pregnant
SCEK100B	SNS	NRK	9-Dec-14	5-7	N	4.9	Pregnant
SCEK110B	SNS	ESK	12-Dec-14	5-7	N	3.5	Pregnant
SCEK126B	CLN	CLN	25-Feb-15	3-5	N	9.3	Pregnant
SCEK136B	CLN	CLN	26-Feb-15	5-7	Y	5.9	Pregnant
SCEK146B	CLN	CLN	9-Dec-14	8-10	N	6.2	Pregnant
SCEK161B	PPH	PPH-OS	31-Mar-15	6-8	N	6.4	Pregnant
SCEK205	MAX	FRT	8-Dec-14	6-8	Y	6.1	Pregnant
SCEK206	MAX	FRT	8-Dec-14	10-12	N	9.6	Pregnant
SCEK207	MAX	FRT	8-Dec-14	8-10	N	3.9	Pregnant
SCEK208	MAX	FRT	8-Dec-14	3-5	N	7.6	Pregnant
SCEK209	SNS	WSK	9-Dec-14	2-3	N	5.2	Pregnant
SCEK210	MAX	KWG	10-Dec-14	3-5	Y	4.9	Pregnant
SCEK211	MAX	KWG	10-Dec-14	8-10	N	6.6	Pregnant
SCEK212	SNS	CLR	10-Dec-14	6-8	Y	7.6	Pregnant
SCEK213	CHIN	CHIN-RRR	11-Dec-14	3-5	N	4.8	Pregnant
SCEK214	CHIN	CHIN-RRR	11-Dec-14	3-5	N	9.5	Pregnant
SCEK215	CHIN	CHIN-RRR	11-Dec-14	6-8	N	2.0	Pregnant
SCEK216	CHIN	CHIN-RRR	11-Dec-14	8-10	N	3.9	Pregnant
SCEK217	PPH	PPH-OS	11-Dec-14	5-7	N	4.7	Pregnant
SCEK218	SNS	CLR	24-Feb-15	8-10	N	0.2	Not Pregnant
SCEK219	SNS	WSK	26-Feb-15	10-12	Y	8.4	Pregnant
SCEK220	SNS	CLR	26-Feb-15	6-8	Y	5.1	Pregnant
SCEK221	MAX	FRT	28-Mar-15	6-8	Y	7.9	Pregnant
SCEK222	CHIN	MLL	01-Apr-15	8-10	N	2.9	Pregnant
SCEK223	CHIN	MLL	01-Apr-15	3-5	N	8.6	Pregnant
SCEK224	CHIN	ETT	01-Apr-15	5-7	N	8.2	Pregnant

Appendix IV: SCEK wolf capture data, northeast British Columbia, December 8, 2014 to April 1, 2015 (abridged), (n=13).

Wolf ID ¹	Capt No.	Status	Pack	Territory	No. Wolves Observ	Date Collared	Collar Type	Ear Tag	East	North	Sex	Colour	Age Est	Comments
BW032	1	Active	Petitot	FRT-TSE	6	8-Feb-15	Lotek VHF	none	581152	6620963	F	Black	2-3	
BW033	1	Active	Petitot	FRT-TSE	6	8-Feb-15	Lotek Iridium	none	581152	6620963	M	Grey	5	
BW034	1	Active	July	CLN	2	9-Feb-15	Lotek VHF	none	625905	6624492	M	Black	3	
BW035	1	Active	Fortune	FRT	10-11	25-Feb-15	Lotek Iridium	none	536573	6625935	M	Grey	5-6	
BW036	1	Active	Fortune	FRT	10-11	25-Feb-15	Lotek Iridium	none	536573	6625935	M	Black	6-8	
BW037	1	Active	Fortune	FRT	10-11	25-Feb-15	Lotek VHF	none	536573	6625935	F	Grey	2-3	
BW038	1	Active	Elleh	CLR	7	5-Mar-15	Vectronic	none	561266	6500974	F	Black	1-2	
BW039	1	Active	Elleh	CLR	7	5-Mar-15	Lotek Iridium	none	561266	6500974	M	Black	3-5	
BW040	1	Active	Elleh	CLR	4	26-Mar-15	Lotek Iridium	none	559286	6496513	M	Black	3-4	
BW041	1	Active	Fortune	FRT	4	28-Mar-15	Lotek Iridium	none	555097	6632311	F	Black	3-5	
BW048	1	Active	Tsimeh	FN	12-15	8-Apr-15	Lotek VHF	none	535515	6550629	M	Black	5+	Pack had a black bear treed
BW050	1	Active	Petitot	FRT-TSE	2	9-Apr-15	Lotek Iridium	none	564743	6606099	F	Light Grey	2	
BW051	1	Active	Tsimeh	FN	3	9-Apr-15	Lotek Iridium	none	524259	6533564	M	Grey	5	

¹ Wolves BW042 to BW047 and BW049 collared for Nexen Inc.

Appendix V: Chinchaga Range late winter survey, March 23, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

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Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga
 Obs Date: March 23, 2015

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 23)	09:40	Clear	Light Breeze	-3 C	None	51-75cm	76-100 %
End (March 23)	17:35	Clear	Light Breeze	+2 C	None	Days since 5 cm Snow: <2	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Maxine Davis (DRFN)

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK026	MLL	GPS	No	1	6	6	0	0	0	0	10	658896	6300582	BB	Grp included SCEK027; release activated but collar did not release; recaptured to replace ATS Iridium collar on April 1, 2015 (new ID SCEK026B)
SCEK027	MLL	VHF	No	1	dupl	dupl	dupl	dupl	dupl	dupl	10	658896	6300582	BB	Group included SCEK026
SCEK029	MLL	VHF	Und ⁴	4	13	6	5	2	0	3	10	654439	6317114	BL	Group included SCEK057; caribou on outline through open black spruce forest
SCEK030	MLL	VHF	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	626655	6349419	BL	Mortality detected during survey; cause of death undetermined predation (likely wolf; MI #082); mature, open canopy spruce-pine forest
SCEK032	MLL	VHF	No	5	12	6	4	0	2	3	10	648455	6315235	BL	
SCEK033B	MLL	GPS	No	12	13	12	1	0	0	1	10	639519	6358606	BL	Recaptured to replace ATS Iridium on Feb 27, 2015
SCEK034	MLL	GPS	No	13	11	7	3	1	0	3	10	640015	6358425	BL	Group included SCEK052
SCEK035	MLL	VHF	No	11	4	4	0	0	0	0	10	613106	6367609	BL	Group included uncollared caribou with orange left ear tag(C2)
SCEK036B	MLL	GPS	No	10	9	7	2	0	0	1	10	602936	6366548	BL	Recaptured to replace ATS Iridium on Feb 27, 2015

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Chinchaga

Obs Date: March 23, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK040	ETT	GPS	No	24	8	5	1	2	0	1	10	657483	6428598	BB	Deployed new collar SCEK224 in group on April 1 (collar recycled from Milligan mort SCEK199)
SCEK041	MLL	VHF	No	6	10	9	1	0	0	1	10	650683	6315860	BL	Group included SCEK197 and unidentified VHF collared caribou (C1); in mature lodgepole pine
SCEK052	MLL	VHF	No	13	dupl	dupl	dupl	dupl	dupl	dupl	10	640015	6358425	BL	Group included SCEK034
SCEK053	MLL	VHF	No	18	7	5	2	0	0	0	10	631629	6339801	BB	
SCEK054	MLL	VHF	No	7	3	3	0	0	0	0	10	646957	6315403	BL	
SCEK055	MLL	GPS	No	14	1	1	0	0	0	0	10	625833	6341535	BB	
SCEK057	MLL	VHF	No	4	dupl	dupl	dupl	dupl	dupl	dupl	10	654439	6317114	BL	Group included SCEK029; on cutline through open black spruce forest
SCEK058	MLL	VHF	Yes	21	9	7	0	2	0	0	10	650688	6370219	BA	Mature mixedwood forest
SCEK059	MLL	VHF	No	22	10	5	5	0	0	5	10	630578	6339735	BL	In island of mature LP in Sb peatland
SCEK060	MLL	VHF	No	9	3	2	1	0	0	1	10	610612	6366004	BL	
SCEK061	MLL	VHF	No	19	1	1	0	0	0	0	10	631687	6340077	BB	
SCEK195	ETT	GPS	No	23	4	4	0	0	0	0	10	651084	6413050	BB	
SCEK196	MLL	GPS	No	15	4	4	0	0	0	0	10	631927	6340243	BL	

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Chinchaga

Obs Date: March 23, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK197	MLL	GPS	No	6	dupl	dupl	dupl	dupl	dupl	dupl	10	650683	6315860	BL	Group included SCEK041 and unidentified VHF collared-caribou (no ear tag); in mature, closed canopy lodgepole pine forest
SCEK198	MLL	GPS	No	17	8	8	0	0	0	0	10	632888	6342368	BL	
SCEK199	MLL	GPS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	628098	6335952	BL	Mortality detected during survey; cause of death wolverine predation (MI #081); black spruce forest immediately adjacent to cutline
SCEK201	MLL	GPS	No	2	4	3	0	1	0	0	10	664917	6286668	BL	In closed-canopy Sb forest
AB149.391	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Not heard
AB150.470	MLL	VHF	No	3	4	3	1	0	0	0	10	655113	6309388	BB	
Uncoll #1	MLL	n/a	n/a	8	3	2	0	1	0	0	10	645892	6307403	CF	In field at PeeJay
Uncoll #2	MLL	n/a	n/a	16	5	4	0	1	0	0	10	633387	6342558	BL	
Uncoll #3	MLL	n/a	n/a	20	4	3	1	0	0	1	10	630499	6339583	BB	

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Chinchaga

Obs Date: March 23, 2015

Obs #	UTM	Chinchaga Range Additional Observations
1	10.658432.6299853	Wolf tracks x 4
2	10.654016.6316739	Moose x 1
3	10.646473.6316204	Wolf tracks x 2-3
4	10.646653.6306694	Wolf track
5	10.645743.6310103	Moose x 2
6	10.638263.6357158	Flock of Sharptail Grouse
7	10.643296.6318099	Moose x 2
8	10.645249.6310137	Moose x 1
Comments		
C1	Suspect unidentified animal is SCEK042 (Iridium collar malfunctioned and assumed released prematurely; last heard March 2013 recruitment survey)	

¹ MLL - Milligan, ETT - Etthithun² Broad Ecosystem Unit (BEU): BA - Boreal White Spruce-Trembling Aspen BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine CF - Cultivated Field

Appendix VI: Chinchaga RRA late winter survey, March 25, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

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Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga RRA
 Obs Date: March 25, 2015

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 25)	11:20	Unbroken Clouds	Calm	-8 C	Low Cloud	51-75 cm	76-100 %
End (March 25)	14:50	Clear	Moderate Breeze	-6 C	None	Days since 5 cm Snow: 2 - 3	

Navigator/Observer: Brad Culling

Recorder/Observer: Ted Euchner

Pilot/Observer: Tom Henderson

Observer: Mac Culling

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK048	RRA-A	VHF	No	6	5	3	1	1	0	1	10	592327	6435020	BB	Group included SCEK215
SCEK142	RRA-A	GPS	No	2	3	3	0	0	0	0	10	626226	6456432	BA	In spruce-aspen mixedwood forest on edge of black spruce peatland
SCEK170	RRA-A	GPS	No	3	4	3	1	0	0	0	10	646281	6449614	BA	In strip of spruce-aspen mixedwood forest on edge of black spruce peatland
SCEK171	RRA-A	GPS	No	4	11	10	1	0	0	0	10	641644	6449557	BB	Group included SCEK172 and SCEK213
SCEK172	RRA-A	GPS	No	4		dupl	dupl	dupl	dupl	dupl	10	641644	6449557	BB	Group included SCEK171 and SCEK213
SCEK189	RRA-A	GPS	No	1	6	3	2	1	0	1	10	614875	6462612	BB	
SCEK213	RRA-A	GPS	No	4	dupl	dupl	dupl	dupl	dupl	dupl	10	641644	6449557	BB	Collar deployed Dec 11, 2014; group included SCEK171 and SCEK172
SCEK214	RRA-A	GPS	No	5	4	3	1	0	0	1	10	641851	6448861	BA	Collar deployed Dec 11, 2014; group included SCEK216; in strip of spruce-aspen mixedwood forest on edge of black spruce peatland

Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

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Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Chinchaga RRA

Obs Date: March 25, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK215	RRA-A	GPS	No	6	dupl	dupl	dupl	dupl	dupl	dupl	10	592327	6435020	BB	Collar deployed on Dec 11, 2014; group included SCEK048
SCEK216	RRA-A	GPS	No	5	dupl	dupl	dupl	dupl	dupl	dupl	10	641851	6448861	BA	Collar deployed Dec 11, 2014; group included SCEK214; in strip of spruce-aspen mixedwood forest on edge of black spruce peatland
Obs #	UTM			Chinchaga RRA Additional Observations											
Comments															

¹ RRA-A - Chinchaga RRA² Broad Ecosystem Unit (BEU): BA - Boreal White Spruce-Trembling Aspen BB - Black Spruce Bog

Appendix VII: Snake-Sahtaneh Range late winter survey, March 26-31, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

Page: 1/7

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh
 Obs Date: March 26-31, 2015

Obs Day: 1/5	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 26)	08:24	Unbroken	Moderate Breeze	+ 2 C	None	26 - 51 cm	76-100 %
End (March 26)	16:33	< 50%	Moderate Breeze	+ 5 C	None	Days since 5 cm Snow: 3-14	
Obs Day: 2/5	Time	CC	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 27)	12:29	> 50 %	Moderate Breeze	- 20 C	None	26 - 51 cm	76-100 %
End (March 27)	14:50	< 50 %	Strong Breeze	-16 C	None	Days since 5 cm Snow: 3-14	
Obs Day: 3/5	Time	CC	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 28)	08:54	> 50 %	Strong Breeze	- 20 C	None	26 - 51 cm	76-100 %
End (March 28)	10:30	< 50 %	Moderate Breeze	-16 C	None	Days since 5 cm Snow: 3-14	
Obs Day: 4/5	Time	CC	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 30)	08:15	> 50 %	Moderate Breeze	- 20 C	None	26 - 51 cm	76-100 %
End (March 30)	16:58	< 50 %	Moderate Breeze	-16 C	None	Days since 5 cm Snow: 3-14	
Obs Day: 5/5	Time	CC	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 31)	08:30	Unbroken	Light Breeze	- 5 C	None	Days since 5 cm Snow: 3 - 14	
End (March 31)	10:05:	Unbroken	Light Breeze	- 6 C	Snow	Days since 5 cm Snow: 3 - 14	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Eva Needley

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK019	CLR	VHF	No	12	2	2	0	0	0	0	10	561133	6504907	BB	
SCEK020	CLR	GPS	No	5	3	3	0	0	0	0	10	590621	6474673	LP	Recaptured to replace ATS Iridium on March 31, 2015 (new ID SCEK020B); group included SCEK150; in mature, closed canopy, lodgepole pine forest

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Snake-Sahtaneh

Obs Date: March 26-31, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK021	CLR	VHF	No	16	4	3	1	0	0	1	10	542900	6512529	BB	
SCEK024	CLR	VHF	Yes	11	4	2	0	2	0	0	10	565273	6499596	BB	
SCEK025	CLR	VHF	No	1	12	8	2	2	0	0	10	548918	6489945	BB	Group included SCEK193, SCEK068, and SCEK157
SCEK068	CLR	VHF	No	1	dupl	dupl	dupl	dupl	dupl	dupl	10	548918	6489945	BB	Group included SCEK193, SCEK025, and SCEK157
SCEK070	CLR	VHF	No	10	2	2	0	0	0	0	10	565906	6499397	BL	
SCEK071	WSK	GPS	No	48	8	8	0	0	0	0	10	594180	6560894	BB	
SCEK073	WSK	VHF	No	41	4	3	0	1	0	0	10	586205	6545428	BL	Group included SCEK219
SCEK079B	TSE	GPS	Yes	20	13	6	4	3	0	3	10	543611	6601952	BL	Recaptured to replace ATS Iridium on Feb 25, 2015
SCEK081	TSE	VHF	No	21	8	6	2	0	0	2	10	553989	6602951	BB	Group included SCEK127
SCEK082	TSE	VHF	No	24	2	2	0	0	0	0	10	558466	6587019	BB	
SCEK085	FRT to TSE	GPS	Yes	23	10	4	4	2	0	3	10	550415	6595336	BL	Group included SCEK175; collared in Fortune, located in Tsea Core
SCEK086	FRT to TSE	VHF	Yes	26	5	2	2	1	0	1	10	571239	6596632	BB	Collared in Fortune, located in Tsea Core
SCEK088	NRK	VHF	No	46	3	3	0	0	0	0	10	596124	6564711	BB	Group included SCEK100B
SCEK089	NRK	VHF	No	38	5	5	0	0	0	0	10	632973	6550475	BB	Group included SCEK187

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Snake-Sahtaneh

Obs Date: March 26-31, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK090	NRK	VHF	No	40	3	3	0	0	0	0	10	612764	6569406	BB	
SCEK091	WSK	VHF	No	50	5	3	2	0	0	2	10	616042	6591558	BL	
SCEK092	NRK	VHF	No	32	2	2	0	0	0	0	10	627373	6581522	BB	Group included SCEK135
SCEK096	WSK	VHF	No	42	3	3	0	0	0	0	10	580894	6546800	BL	Collared in Paradise
SCEK097B	NRK	GPS	No	49	9	7	1	0	1	1	10	592915	6573785	BB	Recaptured to replace ATS Iridium on Dec 12, 2014; group included SCEK188
SCEK100B	ESK	GPS	No	46	dupl	dupl	dupl	dupl	dupl	dupl	10	596124	6564711	BB	Recaptured to replace ATS Iridium on Dec 9, 2014; group included SCEK088
SCEK102	ESK	VHF	No	39	6	5	1	0	0	1	10	629842	6553325	BB	
SCEK103	ESK	VHF	No	37	1	1	0	0	0	0	10	629622	6553032	BL	
SCEK105	NRK-OS	VHF	No	47	8	4	2	2	0	2	10	594271	6565320	BB	Group included SCEK204
SCEK110B	ESK	GPS	Yes	36	4	3	0	1	0	0	10	634337	6553051	BB	Recaptured to replace ATS Iridium on Dec 12, 2014
SCEK111	NRK	GPS	No	44	6	4	1	1	0	1	10	609466	6562683	BB	
SCEK127	TSE	VHF	No	21	dupl	dupl	dupl	dupl	dupl	dupl	10	553989	6602951	BB	Group included SCEK081

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Snake-Sahtaneh

Obs Date: March 26-31, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK131	TSE	VHF	No	25	5	1	0	0	4	0	10	573926	6595729	LP	Group in mature, closed canopy, lodgepole pine forest, coupled with high winds, therefore no classification of 4 uncollared adults
SCEK132	TSE	VHF	No	22	9	7	1	1	0	1	10	554154	6595739	BB	
SCEK135	CAL to NRK	GPS	No	32	dupl	dupl	dupl	dupl	dupl	dupl	10	627373	6581522	BB	Group included SCEK092; collared in Calendar, moved to NRK
SCEK145	CLR	VHF	No	18	3	3	0	0	0	0	10	556551	6514373	BB	
SCEK148	CLR	VHF	No	9	2	1	1	0	0	1	10	589210	6468298	BB	
SCEK149	CLR	VHF	Yes	13	6	3	0	3	0	0	10	536837	6503953	BB	
SCEK150	CLR	VHF	No	5	dupl	dupl	dupl	dupl	dupl	dupl	10	590621	6474673	LP	Group included SCEK020; in mature, closed canopy, lodgepole pine forest
SCEK152	CLR	VHF	Yes	3	4	3	0	1	0	0	10	582861	6486414	BB	Grp included SCEK218
SCEK153	CLR	VHF	No	14	6	6	0	0	0	0	10	531070	6503001	BL	
SCEK156	CLR	VHF	Yes	17	2	1	0	1	0	0	10	567982	6514077	LP	Mature, closed canopy, lodgepole pine forest
SCEK157	CLR	VHF	No	1	dupl	dupl	dupl	dupl	dupl	dupl	10	548918	6489945	BB	Group included SCEK193, SCEK068, and SCEK025
SCEK173	ESK	GPS	n/a	35	4	0	4	0	0	4	10	631689	6571583	BB	Bull; collar replaced Feb 2014 (originally BC1037)

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Snake-Sahtaneh

Obs Date: March 26-31, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK175	FRT to TSE	GPS	No	23	dupl	dupl	dupl	dupl	dupl	dupl	10	550415	6595336	BL	Group included SCEK085; collared in Fortune, located in Tsea Core (SNS group # 23)
SCEK178	FRT to TSE	GPS	No	27	7	5	1	1	0	0	10	574281	6596076	BL	Collared in Fortune, located in Tsea Core; 3 collars in group, including 2 unidentified VHF collars (1 caribou with an older collar/no ear tags and 1 caribou with a red right ear tag); C1
SCEK179	FRT to TSE	GPS	No	28	3	2	1	0	0	1	10	568932	6600455	BB	Collared in Fortune, located in Tsea Core
SCEK182	NRK	GPS	No	34	5	1	4	0	0	4	10	631388	6590504	BB	
SCEK186	NRK	GPS	No	45	4	1	3	0	0	3	10	602012	6569794	BB	
SCEK187	NRK	GPS	No	38	dupl	dupl	dupl	dupl	dupl	dupl	10	632973	6550475	BB	Group included SCEK089
SCEK188	NRK	GPS	No	49	dupl	dupl	dupl	dupl	dupl	dupl	10	592915	6573785	BB	Group included SCEK097B
SCEK191	CLR	GPS	No	6	4	1	3	0	0	3	10	590295	6468696	LP	In mature, closed canopy, lodgepole pine forest
SCEK192	CLR	GPS	No	7	8	5	3	0	0	3	10	603395	6488269	BB	
SCEK193	CLR	GPS	No	1	dupl	dupl	dupl	dupl	dupl	dupl	10	548918	6489945	BB	Group included SCEK068, SCEK025, and SCEK157
SCEK203	TSE	GPS	No	29	1	1	0	0	0	0	10	567818	6597679	BB	Formerly NX04
SCEK204	NRK-OS	GPS	No	47	dupl	dupl	dupl	dupl	dupl	dupl	10	594271	6565320	BB	Group included SCEK105

Project: SCEK Boreal Caribou

Survey: Late Winter Recruitment

Study Area: Snake-Sahtaneh

Obs Date: March 26-31, 2015

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Unc	mm					
SCEK209	WSK to PRD	GPS	No	43	9	5	4	0	0	3	10	567679	6539316	BB	Collar deployed Dec 9, 2014 in WSK; located just to east of PRD
SCEK212	CLR	GPS	Yes	19	2	1	0	1	0	0	10	552780	6509956	BB	Collar deployed Dec 10, 2014
SCEK218	CLR	GPS	No	3	dupl	dupl	dupl	dupl	dupl	dupl	10	582861	6486414	BB	Collar deployed Feb 24, 2015; group included SCEK152
SCEK219	WSK	GPS	Yes	41	dupl	dupl	dupl	dupl	dupl	dupl	10	586205	6545428	BL	Collar deployed Feb 26, 2015; group included SCEK073
SCEK220	CLR	GPS	No	2	7	6	1	0	0	1	10	574517	6476843	BB	Collar deployed Feb 26, 2015
Uncoll #1	CLR	n/a	n/a	4	9	4	2	3	0	2	10	582717	6487147	BB	
Uncoll #2	CLR	n/a	n/a	8	9	1	8	0	0	7	10	590190	6468310	BB	
Uncoll #3	CLR	n/a	n/a	15	1	1	0	0	0	0	10	542671	6512779	BB	
Uncoll #4	TSE	n/a	n/a	30	7	2	4	1	0	4	10	567274	6597534	BL	
Uncoll #5	TSE	n/a	n/a	31	3	0	2	1	0	2	10	570179	6595234	BL	2 bulls and 1 bull calf; Petitot Pack <500m away;C2
Uncoll #6	NRK	n/a	n/a	33	6	2	3	1	0	3	10	625826	6578241	LS	
Obs #	UTM			Snake-Sahtaneh Range Additional Observations											
1	10.546037.6496214			Moose x 3											
2	10.546697.6486448			Moose x 1											
3	10.549605.6490105			Otter tracks											
4	10.570317.6470105			Moose kill - ravens and 1 eagle present; estimate 5-6 wolves based on tracks											

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh
 Obs Date: March 26-31, 2015

Obs #	UTM	Snake-Sahtaneh Range Additional Observations cont.
5	10.559286.6496513	Ellah Pack x 4, including Vertex BW038; deployed new collar BW040
6	10.531667.6501688	Moose x 1
7	10.553480.6500334	Moose x 1
8	10.554689.6595555	Moose x 1
9	10.620087.6612286	Moose x 1 (< 1 km from July Pack on Petitot River)
10	10.619367.6613216	Moose x 1 (on lease)
Comments		
C1	Relocated Grp #27 (Tsea) on March 30; 6 caribou found, including SCEK178 and unid red right VHF, but did not see second unid. collar from previous day (March 28); scanned for all "red right" caribou collar frequencies but no signal detected; Petitot Pack, including BW032 and 4 uncollared wolves were located in same area (10.575791.6596027); pack actively hunting caribou (one uncollared animal seen limping); attempted to deploy additional collars in pack but unsuccessful due to forest cover	
C2	Petitot Pack < 500 m from group SNS #31; 3 wolves seen, including BW032 and BW033	
C3	July Pack x 6 wolves (including BW034) on Petitot River; deployed new collars BW044 and BW045	

¹ CLR - Clarke PRD - Paradise WSK - West Kotcho ESK - East Kotcho NRK - North Kotcho TSE - Tsea OS - Outside core

² Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL- Black Spruce-Lodgepole Pine LP - Lodgepole Pine LS - Small Lake

Appendix VIII: Calendar Range late winter survey, March 28-29, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

Page: 1/3

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Calendar
 Obs Date: March 28-29, 2015

Obs Day: 1/2	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 28)	15:05	> 50%	Moderate Breeze	+ 9 C	None	26-50 cm	76-100 %
End (March 28)	15:35	< 50%	Moderate Breeze	+ 9 C	None	Days since 5 cm Snow: 3- 14	
Obs Day: 2/2	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 29)	08:20	> 50%	Moderate Breeze	- 1 C	None	26-50 cm	76-100 %
End (March 29)	15:50	> 50%	Gentle Breeze	+ 4 C	None	Days since 5 cm Snow: 3- 14	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Eva Needley

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK107	n/a	VHF	No	12	5	5	0	0	0	0	10	644801	6670741	BL	In NT
SCEK108	CLN	VHF	Yes	10	5	4	0	1	0	0	10	638713	6605403	BB	South of the Petitot
SCEK112	n/a	VHF	Yes	17	3	1	1	1	0	1	10	670493	6555491	BL	At headwaters of Shekelie drainage in BC
SCEK113	n/a	VHF	Yes	16	3	1	1	1	0	1	11	330407	6578311	BA	In Alberta at headwaters of Shekelie drainage
SCEK114	CLN	GPS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	622948	6621860	BL	Collar released; retrieved March 29, 2015
SCEK119	RRA-C	GPS	No	13	2	2	0	0	0	0	10	605062	6652602	BL	Approx. 1 km from NT border; typically spends summer in NT
SCEK120	CLN	VHF	Yes	5	3	1	0	2	0	0	10	635418	6610427	LS	On small lake; 2 calves confirmed (photo)
SCEK122	RRA-D	VHF	No	11	7	3	3	1	0	3	10	640643	6649216	BB	

Project: SCEK Boreal Caribou
Obs Date: March 28-29, 2015

Survey: Late Winter Recruitment

Study Area: Calendar

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK123	CLN	VHF	No	7	2	2	0	0	0	0	10	642486	6607907	BB	
SCEK125	n/a	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Not found; caribou moves between BC and NT (as far as Trainor Lake)
SCEK126B	RRA-C	GPS	No	1	7	5	2	0	0	2	10	580407	6640869	BL	Recaptured to replace ATS Iridium on Feb 25, 2015; group included SCEK185; in RRA-C.
SCEK134	CLN	VHF	No	3	11	10	0	1	0	0	10	634834	6609602	BB	South of Petitot
SCEK136B	CLN	GPS	No	15	6	2	2	2	0	1	10	620257	6618282	BB	Recaptured to replace ATS Iridium on Feb 26, 2015; group included uncollared caribou with Yellow Left ear tag
SCEK137	CLN	VHF	No	9	4	3	1	0	0	0	10	642607	6606968	BB	South of Petitot
SCEK138	RRA-D	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	653636	6609085	LS	Mortality detected during survey; cause of death wolf predation (MI#083); small lake in peatland habitat; on border of RRA-D
SCEK146B	CLN	GPS	No	4	7	6	1	0	0	1	10	631093	6605615	BB	Recaptured to replace ATS Iridium on Dec 9, 2014; group included SCEK181
SCEK180	CLN	GPS	No	2	4	3	0	1	0	0	10	632142	6609443	BL	Group included SCEK183; south of Petitot
SCEK181	CLN	GPS	No	4	dupl	dupl	dupl	dupl	dupl	dupl	10	631093	6605615	BB	Group included SCEK146B

Project: SCEK Boreal Caribou
Obs Date: March 28-29, 2015

Survey: Late Winter Recruitment

Study Area: Calendar

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK183	CLN	GPS	No	2	dupl	dupl	dupl	dupl	dupl	dupl	10	632142	6609443	BL	Group included SCEK180; south of Petitot
SCEK184	n/a	GPS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Not found; caribou fitted with refurbished collar in March 2014, collar malfunctioned - not heard since Sept 2014
SCEK185	RRA-C	GPS	No	1	dupl	dupl	dupl	dupl	dupl	dupl	10	580407	6640869	BL	Group included SCEK126B; in RRA-C
Uncoll #1	CLN	n/a	n/a	6	3	2	0	1	0	0	10	642603	6607589	BB	
Uncoll #2	CLN	n/a	n/a	8	3	2	0	1	0	0	10	642800	6607536	BB	
Uncoll #3	CLN	n/a	n/a	14	3	3	0	0	0	0	10	621004	6618887	LS	Group includes uncollared caribou with yellow ear tag; eating cattails on lake margin
Uncoll #4	n/a	n/a	n/a	18	3	0	3	0	0	3	10	670240	6555468	BL	At headwaters of Shekelie drainage in BC
Obs #	UTM			Calendar Range Additional Observations											
1	10.606303.6613374			Moose x 1											
2	10.630379.6617325			Moose x 2											
3	10.630261.6617784			July Pack, 4 wolves observed including BW034; deployed new collars BW042 and BW043											
4	10.606059.6638305			Moose kill; only rumen remaining											
Comments															
C1	Did not attempt to located caribou in vicinity of Trainor Lake at request of NT Department of Environment & Natural Resources (Fort Simpson, NT)														

¹ CLN - Calendar Range excluding RRA-C and RRA-D (central portion)

² Broad Ecosystem Unit (BEU): BA - Boreal White Spruce-Trembling Aspen BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine LS - Small Lake

Appendix IX: Maxhamish Range late winter survey, March 27-28, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

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Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish
 Obs Date: March 27-28, 2015

Obs Day: 1/2	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 27)	09:12	< 50%	Moderate Breeze	0 C	None	51-75cm	76-100 %
End (March 27)	12:16	< 50%	Moderate Breeze	+ 2 C	None	Days since 5 cm Snow: 3 - 14 days	
Obs Day: 2/2	Time	CC	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 28)	08:10	Clear	Moderate Breeze	+ 4 C	None	51-75 cm	76-100 %
End (March 28)	14:10	Clear	Moderate Breeze	+ 9 C	None	Days since 5 cm Snow: 3 - 14 days	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Eva Needley

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK001	CPB	VHF	No	3	4	3	0	1	0	0	10	476817	6588966	BL	
SCEK004	KWG to FRT	VHF	No	6	8	7	0	1	0	0	10	472993	6626820	BL	Group included SCEK078; collared in KWG moved to FRT
SCEK005B	FRT	GPS	No	13	5	4	1	0	0	1	10	519530	6631253	BB	Recaptured to replace ATS Iridium March 2, 2014 (originally collared in KWG); group included BC1033 and SCEK087
SCEK007B	CPB	ATS	No	4	3	2	0	1	0	0	10	471279	6580165	BL	Recaptured to replace ATS Iridium Feb 25, 2015
SCEK062	KWG	VHF	No	10	12	6	5	0	1	4	10	514515	6568622	BB	Group included SCEK169 and BC1009
SCEK064	KWG	VHF	Yes	1	10	1	3	1	5	3	10	495963	6585610	BA	In mature closed canopy mixedwood patch - could not classify 5 adults

Project: SCEK Boreal Caribou
Obs Date: March 27-28, 2015

Survey: Late Winter Recruitment

Study Area: Maxhamish

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK066	CPB	VHF	No	2	8	5	3	0	0	3	10	480431	6584584	BL	Group included BC1014
SCEK076	CPB	VHF	No	5	1	1	0	0	0	0	10	460574	6593970	BL	
SCEK078	FRT	VHF	No	6	dupl	dupl	dupl	dupl	dupl	dupl	10	472993	6626820	BL	Group included SCEK004
SCEK087	FRT	VHF		13	dupl	dupl	dupl	dupl	dupl	dupl	10	519530	6631253	BB	Group included SCEK005B and BC1033; caribou was located in Tsea Core in Feb, moved back to Fortune prior to survey
SCEK128	FRT	VHF	No	12	4	3	1	0	0	1	10	527457	6635212	BB	Group includes SCEK164 and SCEK177
SCEK129	FRT	VHF	Yes	11	2	1	0	1	0	0	10	526707	6625386	BB	
SCEK164	FRT	VHF	No	12	dupl	dupl	dupl	dupl	dupl	dupl	10	527457	6635212	BB	Group includes SCEK128 and SCEK177
SCEK168	FRT	GPS	No	9	4	4	0	0	0	0	10	525616	6569147	BB	Group included SCEK211
SCEK169	KWG	GPS	No	10	dupl	dupl	dupl	dupl	dupl	dupl	10	514515	6568622	BB	Group included SCEK062 and BC1009
SCEK176	FRT	GPS	Yes	7	7	4	2	1	0	2	10	483141	6626027	BL	Group included SCEK208
SCEK177	FRT	GPS	No	12	dupl	dupl	dupl	dupl	dupl	dupl	10	527457	6635212	BB	Group includes SCEK128 and SCEK164
SCEK205	FRT	GPS	Yes	14	8	4	1	3	0	1	10	533541	6620008	BB	Collar deployed Dec 8, 2014; group included SCEK206 and new collar SCEK221
SCEK206	FRT	GPS	Yes	14	dupl	dupl	dupl	dupl	dupl	dupl	10	533541	6620008	BB	Collar deployed Dec 8, 2014; group included SCEK205 and new collar SCEK221

Project: SCEK Boreal Caribou
Obs Date: March 27-28, 2015

Survey: Late Winter Recruitment

Study Area: Maxhamish

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK208	FRT	GPS	No	7	dupl	dupl	dupl	dupl	dupl	dupl	10	483141	6626027	BL	Collar deployed Dec 8, 2014; group included SCEK176
SCEK210	KWG	GPS	Yes	8	5	2	2	1	0	0	10	528834	6568009	BB	
SCEK211	KWG	GPS	No	9	dupl	dupl	dupl	dupl	dupl	dupl	10	525616	6569147	BB	Collar deployed Dec 10, 2014; group included SCEK168
BC1009	KWG	VHF	No	10	dupl	dupl	dupl	dupl	dupl	dupl	10	514515	6568622	BB	Group included SCEK169 and SCEK062
BC1014	CPB	VHF	No	2	dupl	dupl	dupl	dupl	dupl	dupl	10	480431	6584584	BL	Group included SCEK066
BC1033	FRT	VHF	no	13	dupl	dupl	dupl	dupl	dupl	dupl	10	519530	6631253	BB	Group included SCEK005B and SCEK087
Obs #	UTM			Additional Observations											
1	10.555097.6632311			Fortune Pack x 4 wolves, including BW035, BW036, BW037, and new collar BW041											
Comments															
C1	SCEK002 - released in CPB, retrieved Nov 26, 2014														
C2	SCEK085 was collared in Fortune, but located in Tsea Core (SNS group # 23) on March 27, 2015														
C3	SCEK086 was collared in Fortune, but located in Tsea Core (SNS group # 26)														
C3	SCEK175 was collared in Fortune, but located in Tsea Core (SNS group # 23)														
C4	SCEK178 was collared in Fortune, but located in Tsea Core (SNS group # 27) on March 27, 2015														
C5	SCEK179 collared in Fortune, but located in Tsea Core (SNS group # 28)														

¹ CPB - Capot-Blanc FRT - Fortune KWG - Kiwigana OS - Outside core

² Broad Ecosystem Unit (BEU): BA - Boreal White Spruce-Trembling Aspen BB - Black Spruce Bog BP - Boreal White Spruce-Lodgepole Pine LS - Small Lake

Appendix X: Prophet Range late winter survey, March 25, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

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Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Prophet
 Obs Date: March 25, 2015

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 25)	15:00	Unbroken	Moderate Breeze	-7 C	Low Cloud	26-50 cm	76-100 %
End (March 25)	16:32	Unbroken	Moderate Breeze	- 6 C	Low Cloud	Days since 5 cm Snow: 2 - 3	

Navigator/Observer: Brad Culling

Recorder/Observer: Ted Euchner

Pilot/Observer: Tom Henderson

Observer: Mac Culling

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK045	n/a	VHF	No	2	3	3	0	0	0	0	10	559479	6421946	BB	Outside current BC distribution polygon
SCEK049	n/a	VHF	No	3	8	8	0	0	0	0	10	559792	6420659	BL	Outside current BC distribution polygon
SCEK051	RRA-B	VHF	No	6	1	1	0	0	0	0	10	556219	6463438	BB	Outside current range polygon, but inside Prophet RRA
SCEK143	n/a	GPS	No	1	2	2	0	0	0	0	10	560692	6420011	BB	Outside current BC distribution polygon
SCEK144	n/a	VHF	No	5	4	4	0	0	0	0	10	570097	6457858	BB	Outside Prophet Range but within BC distribution
SCEK161	n/a	GPS	No	4	3	3	0	0	0	0	10	557643	6446163	BB	Outside Prophet Range but within BC distribution; group included SCEK217; C2
SCEK217	n/a	GPS	No	4	dupl	dupl	dupl	dupl	dupl	dupl	10	557643	6446163	BB	Outside Prophet Range but within BC distribution; group included SCEK161
Additional Comments															
C1	SCEK051 was not detected in 2014 survey (search included outlying areas of range)														
C2	On March 31, 2015, following completion of the survey, SCEK161 was recaptured to replace ATS Iridium collar with Vertex GPS collar (new ID SCEK161B)														

¹PPH-Prophet Range

² Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine

Appendix XI: Parker Range late winter survey, March 27, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

Page: 1/1

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Parker
 Obs Date: March 27, 2015

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 27)	08:00	>50 %	Light Breeze	+ 5 C	None	26-50 cm	76-100 %
End (March 27)	08:46	>50 %	Light Breeze	+ 4 C	None	Days since 5 cm Snow: 3 - 14	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Eva Needley

Field ID	Core ¹	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU ²	Comments
						F	M	Juv	Uncl	mm					
SCEK010	PRK	VHF	No	3	6	5	1	0	0	0	10	491469	6524293	BB	
SCEK012	PRK	VHF	No	6	13	8	5	0	0	3	10	489942	6525862	BB	
SCEK014B	PRK	GPS	No	2	4	2	1	1	0	1	10	500296	6522309	BB	Recaptured to replace ATS Iridium Feb 24, 2015
SCEK015	PRK	VHF	No	5	3	2	1	0	0	0	10	488965	6524836	BB	
SCEK016B	PRK	GPS	No	1	6	5	1	0	0	1	10	506575	6519744	BB	Recaptured to replace ATS Iridium Feb 24, 2015; peatland lake complex
SCEK194	PRK	GPS	No	7	2	1	1	0	0	0	10	489367	6524931	BB	
BC1001	PRK	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Not heard since spring 2014; collar battery assumed dead
Uncoll #1	n/a	n/a	n/a	4	5	2	2	1	0	0	10	489344	6524623	BB	
Obs #	UTM				Parker Range Additional Observations										
1	10.500131.6520861				Moose x 1										
2	10.499102.6522888				Moose x 3										
3	10.494004.6531580				Moose x 1										

¹ PRK - Parker Range

² Broad Ecosystem Unit (BEU): BB - Black Spruce Bog

Appendix XII: Fort Nelson Core late winter survey, March 27, 2015
 Animal Observation Form – Boreal Caribou 2015 Late Winter Recruitment Survey

Page: 1/1

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Fort Nelson
 Obs Date: March 27, 2015

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 27)	08:52	> 50 %	Light Breeze	0 C	None	26-50 cm	76-100 %
End (March 27)	09:12	< 50 %	Light Breeze	0 C	None	Days since 5 cm Snow: 3 - 14 days	

Navigator/Observer: Brad Culling

Recorder/Observer: Diane Culling

Pilot/Observer: Tom Henderson

Observer: Eva Needley

Field ID	Core ¹	Type	Calf ²	Grp #	Grp Tot	Classification					Zone	East	North	BEU ³	Comments
						F	M	Juv	Uncl	mm					
SCEK009B	FN	GPS	Und	1	7	6	0	1	0	0	10	500728	6553373	BB	Recaptured to replace ATS Iridium Feb 24, 2015; not possible to determine which cow the single calf in group #1 belonged to
SCEK166	FN	GPS	Und	1	dupl	dupl	dupl	dupl	dupl	dupl	10	500728	6553373	BB	
SCEK167	FN to KWG	GPS	Yes	2	2	1	0	1	0	0	10	501395	6569015	BB	Outside FN Core - crossed Fort Nelson River to move to edge of KWG Core
Obs #	UTM			Fort Nelson Core Additional Observations											
1	10.499508.6559329			Extensive, older cratering on creek											
Comments															

¹ FN - Fort Nelson Core

² Und - calf status undetermined

³ Broad Ecosystem Unit (BEU): BB - Black Spruce Bog

Appendix XIII: Proportion of boreal caribou collared by range at the end of Year III (April 30, 2015), based on March 2015 recruitment survey minimum population counts.

	CHIN	CHIN- RRA	SNS	CAL	MAX	PPH	PRK	FN	Total
Total Caribou Observed	156	33	258	81	81	21	39	9	678
No. Collars Active April 30, 2015	29	10	50	20	31	6	6	3	155
% MinPop ¹ Collared	19	30	19	25	38	29	15	33	23

¹ Minimum population based on caribou counted during March 2015 survey