2017

BC Boreal Caribou Implementation Plan: Year V (2016-2017) Field Activities Progress Report

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Fort St. John, British Columbia

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DEDICATION

Maxine Davis

Doig River First Nation

1959 - 2016

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British Columbia's boreal caribou ranges fall within the traditional lands of the Treaty 8 First Nations; we appreciate the continued support of the Treaty 8 Chiefs and Communities for this project. Eva Needlay, William Needlay, and Riley Burke, of the Fort Nelson First Nation, and Wally Attachie, of Doig River First Nation, assisted in field activities during Year V, including mortality site investigations and the March 2017 recruitment survey.

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Cover photo - Riley Burke, Fort Nelson First Nation, at mortality site of SCEK216, Chinchaga North Core Area, June 16, 2016 (photo by B. Culling).

[1]The use of the term SCEK appears throughout this report for consistency with the Year I to Year IV progress reports.

EXECUTIVE SUMMARY

The boreal ecotype of woodland caribou (*Rangifer tarandus*; boreal caribou) is listed as *Threatened* by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is on the provincial red list in British Columbia (BC). 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.

Between December 2012 and March 2016, 240 individual boreal caribou (*hereafter*, SCEK caribou) were radio-collared in British Columbia's boreal caribou ranges as a component of the BCIP. These animals, as well as boreal caribou previously collared by the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (MFLNRORD caribou), have been monitored through transmitted GPS/satellite data and periodic telemetry monitoring flights and late winter recruitment surveys to track adult female survival, collect information on causes of caribou mortality, and estimate annual calf recruitment to ten months. This report describes results of field activities conducted in Year V (May 1, 2016-April 30, 2017), including scheduled fixed-wing telemetry monitoring flights, mortality site investigations, and a March 2017 calf recruitment survey. Information on adult female caribou mortality and survival is used in conjunction with annual calf recruitment surveys to assess population trend. Biological samples collected from mortality investigation sites support associated research on boreal caribou health in British Columbia.

At the beginning of Year V (May 1, 2016), 146 radio-collared caribou were potentially active in BC's boreal caribou ranges, including 143 SCEK caribou and 3 MFLNRORD caribou.

As of May 1, 2016, only caribou mortality indications involving GPS/satellite collars were investigated at the time of detection. When possible, mortalities of VHF-collared caribou identified during scheduled telemetry flights were investigated and radio-collars recovered incidental to related fieldwork. Thirteen SCEK caribou mortalities were detected between May 1, 2016 and April 30, 2017, including 6 cases of confirmed and 1 case of suspected wolf predation. One caribou (SCEK004/BC1050; Maxhamish) died of apparent poor condition or disease. The intact carcass was retrieved for necropsy, which revealed systemic inflammation resulting from 2 abdominal punctures (H. Schwantje, pers. comm.). Four VHF-collared caribou mortalities were not investigated. We were unable to determine whether the cause of death for the remaining caribou was due to predation or if the animal died and was later scavenged.

The standardized annual finite survival rate for 146 adult females during the 12-month period between May 1, 2016 and April 30, 2017 was 0.89 ± 0.03 SE.

Late winter recruitment surveys were conducted for all herds between March 21 and 31, 2017. A total of 499 boreal caribou (352 adult females (F), 73 adult males (M), and 74 calves (Cf) were recorded in 94 groups, including 6 unmarked groups located incidentally and 4 groups (16 caribou) associated with SCEK caribou located north of the BC/NT border. Mean group size was 5.3 ± 2.6 SD (range 1 to 13). Overall calf recruitment to 10 months in March 2017 was 21 calves:100 cows, with calves representing 15% of the minimum count.

Based on a March 2017 overall recruitment rate (i.e., all ranges combined) of 21 calves:100 cows and the 2016-2017 standardized finite adult female survival rate of 0.89, lambda equals 0.99, which indicates BC's boreal caribou population remained roughly stable during Year V.

At the end of Year V (April 30, 2017), 106 radio-collared caribou remained active within BC's boreal caribou ranges, including 105 SCEK caribou (54 Vectronic Vertex GPS, 51 Lotek VHF) and 1 MFLNRORD caribou (Lotek VHF). These active collars represent an average of 22% of the minimum number of caribou counted by range during the 2017 recruitment survey. All ATS Iridium and Lotek LifeCycle collars deployed during the project have ceased to function and an increasing number of the 106 remaining collars are approaching the end of their battery life.

Between the start of BCIP monitoring, in mid-December 2012, and the end of April 2017, we identified 117 boreal caribou mortalities (101 SCEK, 7 MFLNRORD, 9 uncollared) within BC's ranges. The cause of death included 78 confirmed and 8 suspected wolf kills and 3 cases of wolverine predation. One caribou died accidentally and 6 died as a result of poor condition or disease. Two Maxhamish caribou were apparently legally harvested by First Nations community members from nearby Fort Liard, Northwest Territories (NT). Four VHF-collared caribou mortalities were not investigated. The cause of death for the remaining 15 animals could not be conclusively determined, however poor condition or disease was the apparent cause in several cases.

Twenty-two wolf collar frequencies were monitored during scheduled caribou telemetry flights in Year V; 2 mortalities were detected (BW042, BW045). On April 30, 2017, 4 wolf collars were known to

be still active within BC's boreal caribou ranges. The status of the remaining collars was undetermined, with the majority assumed to have exceeded their battery lives.

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1 INTRODUCTION

Boreal ecotype woodland caribou (population #14; Designatable Unit DU6) are red-listed in British Columbia (BC) 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, 240 adult caribou (239F, 1M) were radio-collared in British Columbia's boreal caribou ranges between December 2012 and February 2016. The fate of these animals, as well as boreal caribou previously collared by the BC Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (MFLNRORD) is monitored to track adult survival and calf recruitment and determine sources of adult caribou mortality. Information on adult female caribou mortality and survival is used in conjunction with annual calf recruitment surveys to assess population trend. Biological samples collected from mortality investigation sites support associated research on boreal caribou health in British Columbia.

This report provides details of field activities conducted during Year V of the project (May 1, 2016 to April 30, 2017), including scheduled fixed-wing telemetry monitoring flights, mortality site investigations, and March 2017 late winter recruitment survey.

2 METHODS

2.1 Study Area

In British Columbia, boreal caribou occur in the northeastern corner of the province, in an area bounded by the 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° longitude), and the northern limit of the agricultural zone to the south (roughly N57° latitude; Fig. 1). The previously established boreal caribou ranges (Culling et al. 2004, MOE 2010) were recently updated to reflect the large amount of telemetry data collected since 2012 (Wilson 2014, MFLNRO 2015, Culling and Cichowski 2017). The most recent revision includes the previously defined Chinchaga (CHIN), Snake-Sahtaneh (SNS), Calendar (CAL), and Maxhamish (MAX) ranges, as well as incorporating the Prophet, Parker, and Fort Nelson core areas into the Westside Fort Nelson Range (WSR). Within these caribou ranges, 16 associated core areas are defined as areas of high current capability and suitability based on general habitat requirements (i.e., treed peatlands, terrestrial and arboreal lichen forage base [Culling et al. 2004]). Other changes resulting from the recent revision include amalgamating the 3 original core areas surrounding Kotcho Lake into one large polygon (Kotcho Core Area), incorporating a new core area in the northern portion of the Chinchaga Range (Chinchaga North Core Area [CNCA]), which roughly corresponds to the former Chinchaga Resource Review Area (Chinchaga RRA).

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. Additional information on BC's boreal caribou ranges and core areas are found in MOE (2010) and Culling and Cichowski (2017).

For the field component of this project, the CNCA (Chinchaga RRA) has been 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 core areas and is accessed via helicopter from Fort Nelson. For consistency with previous years, the 3 core areas (Prophet, Parker, Fort Nelson) of the newly formed Westside Fort Nelson Range will be presented separately.

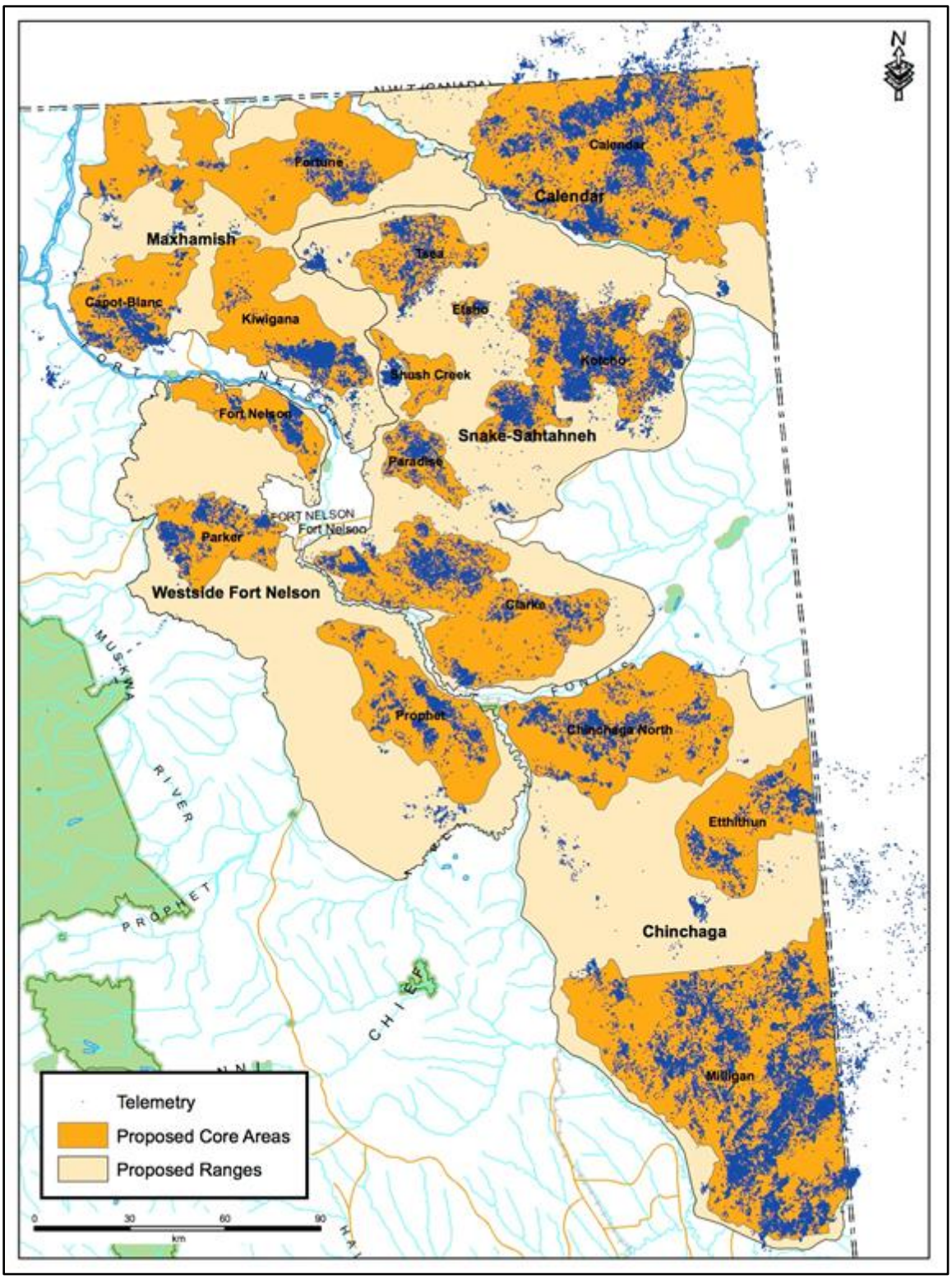

Figure 1. Boreal caribou ranges and core areas in British Columbia (proposed MFLNRO 2015 revisions; from Culling and Cichowski 2017)

2.2 Telemetry Monitoring and Mortality Site Investigations

We conducted scheduled fixed-wing telemetry monitoring flights throughout Year V to determine the approximate location and VHF beacon status of all boreal caribou believed to be active in the study area, including SCEK caribou and caribou previously collared by MFLNRORD.[2] In lieu of dedicated fixed-wing flights, between December 2016 and February 2017, we conducted telemetry monitoring opportunistically during related and unrelated field activities and ferry flights within caribou ranges. March 2017 monitoring was conducted in conjunction with the 2017 late winter recruitment survey.

As of May 1, 2016, only caribou mortality indications involving GPS/satellite collars were investigated at the time of detection. When possible, mortalities of VHF-collared caribou identified during scheduled telemetry flights were investigated and recovered from the field incidental to related fieldwork.

We conducted ground-based site investigations for GPS collar mortalities as soon as possible following detection by VHF signal status or transmitted GPS/satellite data. We determined the cause of death, collected biological samples, and recovered the collar. We collected predator scat samples from mortality sites. All biological samples collected were forwarded to the Provincial Wildlife Veterinarian.

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).

2.2.1 Wolf Telemetry Monitoring

During scheduled boreal caribou fixed-wing telemetry flights, we also monitored all wolf collar frequencies believed to be still active within BC's boreal caribou ranges for approximate location and mortality status. These include wolf collars deployed during associated research projects.

[2] A number of boreal caribou radio-collared by Alberta Environment and Parks (formerly Alberta Sustainable Resource Development) but typically found within the BC Chinchaga Range were monitored throughout the project to track mortalities and augment the sample of SCEK caribou during March recruitment surveys. None of these Lotek VHF collars remained active in BC in Year V.

2.3 Late Winter Recruitment Survey

We conducted late-winter composition surveys in all BC boreal caribou ranges to estimate annual calf recruitment. We used telemetry to locate all radio-collared caribou from a Bell 206B helicopter and classified all caribou in each group encountered by sex and age using criteria defined by the Resources Inventory Standards Committee (RIC 2002), including females (>1 year), males (>1 year), calves, and mature males. To reduce helicopter disturbance (i.e., approach distance) to caribou groups, we used image-stabilizing binoculars to classify animals and identify individual collared caribou by ear tag colour combination. We augmented the sample of SCEK and MFLNRORD collars by classifying incidental 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 Year V Telemetry Monitoring and Mortality Site Investigations

At the beginning of Year V (May 1, 2016), 146 radio-collared caribou were potentially active within BC's boreal caribou ranges, including 143 SCEK caribou (72 Vectronic, 10 Lotek LifeCycle, 61 Lotek VHF) and 3 MFLNRORD-collared caribou (Lotek VHF).

Table 1 shows the status of 240 radio-collars deployed during the project as of April 30, 2017. Twenty-eight GPS collars were confirmed to have ceased functioning (Appendix I). These included 20 collars deployed in the winters of 2013 and 2014 that reached the end of their normal battery lives and 8 Vertex GPS collars deployed in February 2016 that failed prematurely, functioning between 1 and 12 months. The VHF signals of BC1014 (VHF; Capot-Blanc) and BC1033 (VHF; Fortune) had not been detected for several months prior to the 2017 recruitment survey; we assume these collars have reached the end of their battery lives. Only 1 original MFLNRORD collar (BC1028; Tsea) remained active at the end of Year V.

Table 1. Status to April 30, 2017 of 240 radio-collars deployed on boreal caribou in northeastern British Columbia between December 2012 and February 2016.

Radio-collar Status April 30, 2017	Range								Total
	Chinchaga		Snake-Sahtaneh	Calendar	Maxhamish	Westside Fort Nelson			
	Milligan/ Etthithun	CNCA[1]				Prophet	Parker	Fort Nelson	
Active[2]	19	6	39	15	19	3	3	2	106
Battery Expired	3	2	7	3	4	0	0	1	20
Failed Prematurely	3	1	2	3	2	0	2	0	13
Caribou Mortality	17	10	30	12	17	7	5	3	101
Total Collars	42	19	78	33	42	10	10	6	240

[1] CNCA – Chinchaga North Core Area (formerly, the Chinchaga RRA)

[2] Including SCEK232, which malfunctioned but relayed sporadic GPS data to the end of Year V

At the end of Year V, 106 radio-collared caribou remained active within BC's boreal caribou ranges, including 105 SCEK caribou (54 Vectronic Vertex GPS, 51 Lotek VHF) and 1 MFLNRORD caribou (Lotek VHF). However, an increasing number of these remaining collars are approaching the end of their battery life. All ATS Iridium and Lotek LifeCycle collars deployed during the project have ceased to function.

3.1.1 Caribou Mortality Investigations

Thirteen radio-collared caribou (4 Vectronic Vertex GPS, 9 Lotek VHF) died between May 1, 2016 and April 30, 2017 (Table 2). Ten of these were captured during the initial collaring sessions (Year I; December 2012-April 2013), including 5 recaptured animals that had been originally collared by MFLNRORD prior to 2012. Five of the 10 animals captured in 2012-2013 were mature adults at the time of capture (field age estimate 5-10 years) and 1 was an old adult (field age estimate > 10 years).

We conducted site investigations for 9 of 13 caribou mortalities detected in Year V. Four VHF-collared caribou mortalities were not investigated. Seven of 9 (78%) caribou deaths investigated were confirmed (6) or suspected (1) wolf kills. One caribou (SCEK004/BC1050; Maxhamish) died of poor condition/disease. We were unable to determine whether the cause of death for the ninth caribou was due to predation or if the animal died and was later scavenged.

We detected a mortality signal for SCEK004/BC1050 (Lotek VHF; MI-115) during the March 30, 2017 survey of the Fortune Core Area. A site investigation found the caribou bedded at the base of a small black spruce, covered with approximately 37 cm of snow. The apparent cause of death was poor

Table 2. Radio-collared boreal caribou mortalities detected during Year V (May 1, 2016-April 30, 2017), northeastern British Columbia (*n*=13)

Mort Invest No.	Caribou ID	Range[1]	Core Area[2]	Collar Type	Date Collared	Date Mortality Detected	Date of Death	Cause of Death
105	SCEK108	MAX	CAL	VHF	24-Feb-13	01-May-16	Unknown	Undetermined
106	SCEK216	CHIN	CNCA	GPS	11-Dec-14	06-Jun-16	05-Jun-16	Suspected wolf kill
107	SCEK235	CHIN	CNCA	GPS	26-Feb-16	21-Jun-16	17-Jun-16	Wolf kill
108	SCEK182	SNS	KOT	GPS	3-Mar-2014	03-Oct-16	29-Sep-16	Wolf kill
109	SCEK027	CHIN	MLL	VHF	17-Jan-2013	10-Jul-16	Unknown	Not Investigated
110	SCEK227	CHIN	MLL	GPS	19-Feb-2016	28-Feb-17	25-Feb-17	Wolf kill
111	SCEK053	CHIN	MLL	VHF	30-Jan-2013	21-Mar-17	Unknown	Not Investigated
112	SCEK012/BC1041	WSR	PRK	VHF	7-Jan-2013	28-Mar-17	Unknown	Wolf kill
113	SCEK010/BC1039	WSR	PRK	VHF	7-Jan-2013	28-Mar-17	Unknown	Not Investigated
114	SCEK051/ BC1060	WSR	PPH	VHF	26-Jan-13	29-Mar-17	Unknown	Wolf kill
115	SCEK004/BC1050	MAX	FRT	VHF	18-Dec-12	30-Mar-17	Unknown	Poor Condition/ Disease (Necropsy Pending)
116	SCEK081	SNS	TSE	VHF	5-Feb-2013	30-Mar-17	Unknown	Wolf kill
117	SCEK045/BC1045	WSR	PPH	VHF	25-Jan-2013	24-Apr-17	Unknown	Not Investigated

[1] CHIN - Chinchaga SNS – Snake-Sahtaneh CAL – Calendar MAX- Maxhamish WSR – Westside Fort Nelson
[2] MLL – Milligan CNCA – Chinchaga North Core KOT – Kotcho TSE – Tsea CAL – Calendar FRT – Fortune PPH – Prophet PRK - Parker

condition. We returned to the site on April 1 to retrieve the intact carcass, which was slung to the nearest road access and delivered by vehicle to Fort St. John for necropsy by the Provincial Wildlife Veterinarian. The necropsy revealed the cause of death to be systemic inflammation (chronic suppurative peritonitis, myositis, and cellulitis) resulting from 2 abdominal punctures (H. Schwantje, pers. comm.).

Detailed results of Year V mortality investigations are found in mortality investigation summary reports #29 to #31 (DES 2016, DES 2017).

The standardized annual finite survival rate for 146 adult female[3] caribou active during the 12-month period between May 2016 and April 2017 was 0.89 ± 0.03 SE (95% C.I. = 0.84 to 0.95).

3.1.2 Wolf Telemetry

We continued to scan for 22 wolf collar frequencies during Year V caribou telemetry flights; 2 wolf mortalities were detected (BW042, BW045). On April 30, 2017, 4 wolf collars were known to be still active within BC's boreal caribou ranges. The status of the remaining collars was undetermined, with the majority assumed to have exceeded their battery lives.

3.2 Year V Caribou Late Winter Recruitment Survey

We conducted late winter recruitment surveys on all herds between March 21 and 31, 2017 (Appendices II to IX). Figure 2 shows helicopter flight lines flown and location of caribou groups encountered. Results of the survey are presented in Table 3.

We encountered clear weather throughout the survey. While visibility was good, sightability was hindered by patchy snow conditions resulting from unseasonably warm temperatures in late March. Daytime temperatures ranged from a morning low of -8°C on March 21 (Chinchaga survey) to an afternoon high of +11°C on March 31 (Day 4, Snake-Sahtaneh survey). There was 76-100% snow cover throughout the survey, with snow depths typically ranging between 26-50 cm. Warm temperatures resulted in rapidly diminishing snow cover during the last few days of the survey. Although fresh snow

[3]Excluding adult male SCEK173/BC1037

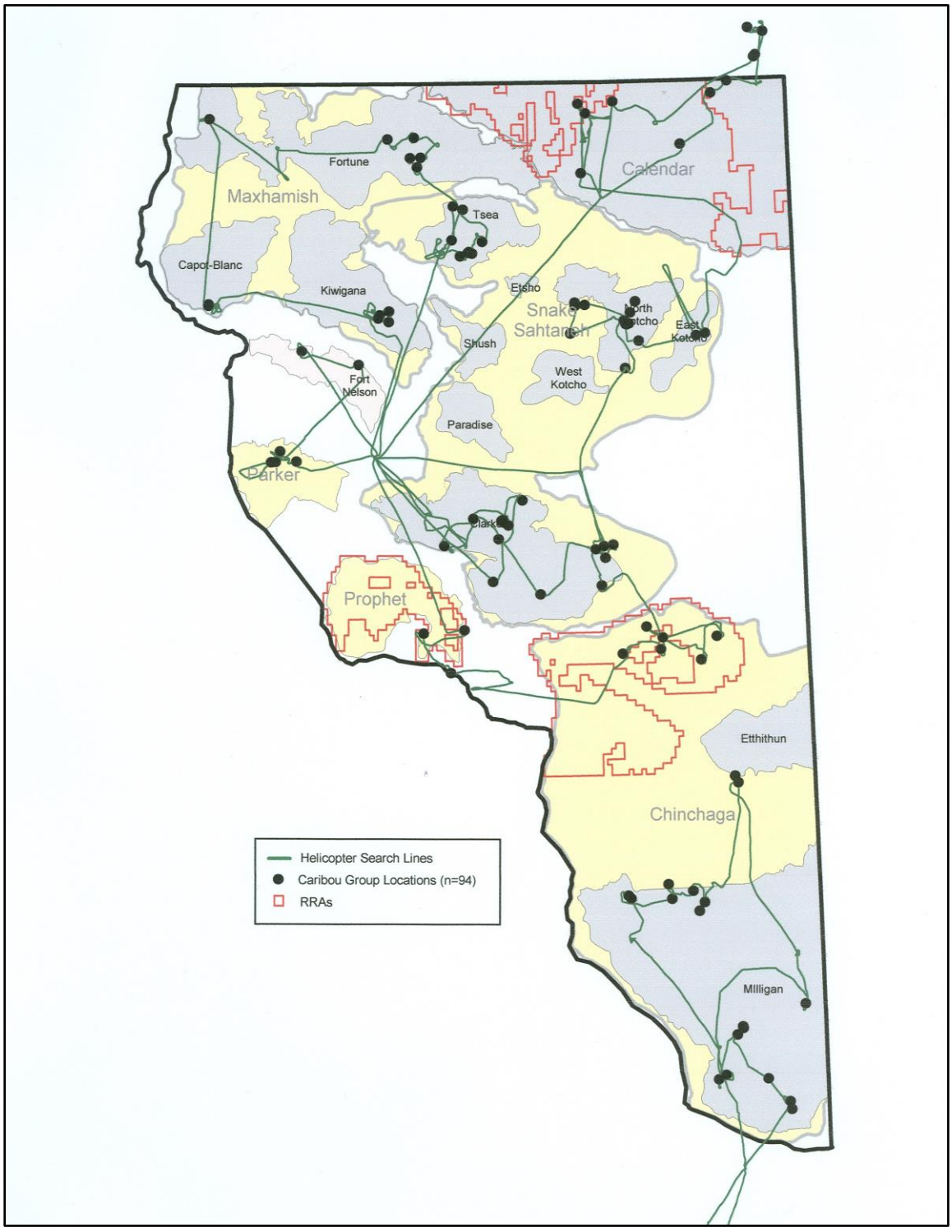

Figure 2. Helicopter flight lines and location of boreal caribou groups observed during late winter recruitment survey, northeastern British Columbia, March 21-31, 2017.

Table 3. Results of 2017 boreal caribou late winter recruitment survey, including age-sex composition, calves per 100 cows, and group size by range, northeastern British Columbia, March 21-31, 2017.

Range/Core Area[1]	Classification					Total Caribou Observed	Calves:100 Cows	Total No. Groups	Min Group Size	Max Group Size	Mean Group Size (± SD)
	F	M	Cf	Unclass	MM[2]						
Chinchaga - MLL/ETT	84	9	15	0	5	108	18 calves:100 cows	18	1	12	6.0 ± 2.7
Chinchaga - CNCA[3]	32	3	7	0	1	42	22 calves:100 cows	6	2	13	7.0 ± 3.7
Snake-Sahtaneh	111	28	30	0	11	169	27 calves:100 cows	38	1	10	4.4 ± 2.1
Calendar (All)[4]	39	10	6	0	4	55	15 calves:100 cows	11	2	9	5.0 ± 2.4
Calendar (BC only)[5]	*(29)*	*(8)*	*(6)*	*(0)*	*(4)*	*(43)*	*n/a*	*(7)*	*n/a*	*n/a*	*n/a*
Maxhamish	50	16	8	0	8	74	16 calves:100 cows	12	2	13	6.2 ± 3.4
Prophet (WSR)	16	1	1	0	1	18	6 calves:100 cows	3	4	8	6.0 ± 2.0
Parker (WSR)	15	3	5	0	2	23	33 calves:100 cows	4	4	7	5.8 ± 1.3
Fort Nelson (WSR)	5	3	2	0	2	10	n/a[6]	2	4	6	5.0 ± 1.4
Total_All Groups[7]	352	73	74	0	34	499	21 calves:100 cows	94	1	13	5.3 ± 2.6
Minimum Count BC Caribou[8]	342	71	74	0	30	487	n/a	n/a	n/a	n/a	n/a

[1] Prophet, Parker and Fort Nelson core areas, which encompass the new Westside Fort Nelson Range (WSR), are presented individually to compare with previous surveys

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

[3] CNCA - Chinchaga North Core Area, which roughly corresponds to the former Chinchaga RRA

[4] Includes all groups associated with SCEK-collared caribou, including 4 groups (16 caribou) found in NT during the March 2017 survey

[5] Includes all groups found within the Calendar Range plus 4 SCEK caribou collared in Calendar but found in NT during the March 2017 survey

[6] Ranges with less than 10 caribou observed excluded

[7] Includes all groups associated with SCEK-collared caribou, including groups found in NT

[8] Includes all groups found within BC plus 4 SCEK caribou collared in Calendar but found in NT during the March 2017 survey

had fallen within 3 days of the commencement of the survey, in the Chinchaga Range, warm temperatures created patchy snow conditions, which resulted in very poor spotting conditions in the Milligan Core Area.

During the March 2017 survey, we observed a total of 499 boreal caribou (352F, 73M, 74Cf) in 94 groups (Table 3). Four SCEK-collared Calendar caribou were located north of the BC/NT border in 4 separate groups, totalling 16 animals. Excluding the 12 uncollared animals associated with the 4 SCEK caribou located north of the BC/NT border, the March 2017 survey resulted in a minimum count of 487 caribou (342F, 71M, 74Cf) for all ranges combined.

Six unmarked groups (22 caribou) were located incidentally during the survey, including 5 groups in the Snake-Sahtaneh Range (21 caribou) and 1 in the Parker Core Area (6 caribou). Overall mean group size, including the 4 groups found in the NT, was 5.3 $\pm$ 2.6 SD (range 1 to 13).

Year V calf recruitment to 10 months for all herds combined was 21 calves:100 cows, with calves comprising 15% of the total minimum count (Table 3). Recruitment varied from 6 calves:100 cows to 33 calves:100 cows in the Prophet and Parker core areas, respectively.

Chinchaga Range

Twenty-three radio collared boreal caribou were considered potentially present in the portion of the Chinchaga Range encompassed by the Milligan and Etthithun core areas prior to the start of the March 21, 2017 recruitment survey (Appendix II). We searched for 3 GPS collars that had ceased transmitting satellite data during the previous year, including 2 collars that had reached the end of their normal battery lives (SCEK040, SCEK197) and one that failed prematurely (SCEK038B; [Appendix I]). All 3 had also ceased transmitting VHF beacons; none were encountered incidentally in marked groups. SCEK029 (Lotek VHF; MLL) was not heard or seen in or between the Milligan and Etthithun core areas during the March 21 survey. We scanned for its VHF beacon during the subsequent March 29 Chinchaga North Core Area survey but could not detect it.[4] One VHF-collared caribou mortality (SCEK053; Milligan; MI-11) was detected during the survey, however no landing site was available so a ground inspection

[4] SCEK029's VHF beacon was heard on normal mode in the Milligan Core Area on the April 2017 telemetry flight. A similar pattern occurred the previous year, when the caribou was not located in or between Milligan, Etthithun, or the Chinchaga RRA (CNCA) during the March 2016 survey, but was located transmitting a normal signal during the April 2016 telemetry flight.

was not done. Eighteen active collars contributed to the 2017 Chinchaga survey, including 16 and 2 in the Milligan and Etthithun core areas, respectively.

We counted 108 caribou (84F, 9M, 15Cf) in 18 groups in the Milligan and Etthithun core areas combined (Table 3, Appendix II). Mean group size was 6.0 ± 2.7 SD (range 1-12). Only 1 active radio-collared animal was present in each of the 18 groups located, however SCEK035 (Milligan) was found in a group of 5 females including 1 unidentified animal with an older VHF collar and a yellow right ear tag. Patchy snow in the Milligan Core Area contributed to poor search conditions; we did not locate any uncollared groups incidentally. We found SCEK223 in a group of 4 caribou (3F, 1cf) that were bedded in a cultivated field at PeeJay.

We calculated a ratio of 18 calves:100 cows for the Milligan and Etthithun core areas of the Chinchaga Range, combined.

Chinchaga North Core Area (*formerly, Chinchaga RRA*)

Eleven SCEK-collared boreal caribou were considered potentially present in the portion of the Chinchaga Range encompassed by the Chinchaga North Core Area prior to the start of the 2017 recruitment survey, including SCEK029, which was collared in the Milligan Core Area but moves between there and the CNCA, and SCEK161B/BC1059, which was collared in Prophet on 3 occasions (February 2011, April 2013, March 2015) but moves between Prophet and the CNCA (Appendix III). Three GPS radio-collars were not transmitting GPS data or a VHF beacon, including 2 whose batteries had expired (SCEK142, SCEK172) and 1 whose Vertex collar failed prematurely (SCEK236; [Appendix I]). On March 29, 2017, we located 9 of the 11 caribou; SCEK029 and SCEK142 were not heard or seen. SCEK172 and SCEK236 were located visually in groups with other collared animals and their identities were confirmed by collar type/eartag colour configuration. Seven active radio-collars contributed to the Chinchaga North Core Area 2017 survey.

We counted 42 caribou (32F, 3M, 7Cf) in 6 groups (Table 3, Appendix III). Two of the 6 groups contained multiple radio-collared caribou, including 1 group with 2 and 1 group with 3 collared animals. We did not find any incidental unmarked groups in the CNCA. Mean group size was 7.0 ± 3.7 SD (range 2-13).

We calculated a ratio of 22 calves:100 cows for the portion of the Chinchaga Range encompassed by the Chinchaga North Core Area.

Snake-Sahtaneh Range

Forty-eight radio collared boreal caribou were considered potentially present in the Snake-Sahtaneh Range prior to the March 2017 recruitment survey (Appendix IV), including 40 active SCEK caribou, 1 active MFLNRORD caribou (BC1028), 6 animals whose collars had reached the end of their battery life (SCEK071, SCEK111, SCEK187, SCEK191, SCEK192, SCEK204), and 1 whose Vertex collar had failed prematurely (SCEK228; Appendix I). We also continued to search visually for adult male SCEK173/BC1037, whose GPS collar failed in late 2015. Four of the 6 caribou with expired batteries were not heard or seen, but SCEK111 and SCEK204 were located visually in groups with other collared animals and their identification confirmed by collar type/eartag configuration. SCEK228 was also not heard or seen. Two caribou had moved out of the Snake-Sahtaneh Range in Year V. SCEK209 was collared in West Kotcho in December 2014 and moved to the Kiwigana Core Area of the Maxhamish Range. SCEK148 was collared in Clarke in March 2013 and moved to the Prophet Core Area of the Westside Fort Nelson Range. One mortality (SCEK081; Tsea; MI-116) was detected and investigated during the survey. Therefore, 38 active collars contributed to the March 2017 Snake-Sahtaneh survey.

We counted 169 caribou (111F, 28M, 30Cf) in 38 groups, including 5 unmarked groups encountered incidentally (Table 3, Appendix IV). Six groups contained multiple radio-collared animals, including 5 groups with 2 collars and 1 group with 3 collars. Mean group size was 4.4 ± 2.1 SD (range 1-10). We calculated a ratio of 27 calves:100 cows for the Snake-Sahtaneh Range.

Calendar Range

We attempted to locate 19 SCEK-collared caribou that were potentially present in the Calendar Range during the March 31, 2017 survey (Appendix V), including 3 GPS collars that had reached the end of their expected battery life (SCEK119, SCEK135, SCEK185) and 1 Vertex GPS collar (SCEK234) that failed prematurely (Appendix I). SCEK119, SCEK135, and SCEK234 were not heard or seen on March 31, but SCEK185 was located visually in a collared group and identified by collar type/eartag configuration. Despite a concerted effort, which included flying along the eastern border of the Calendar Range at high altitude to scan into AB, we were unable to locate SCEK137 (Lotek VHF) during the March 2017 survey.[5] This caribou, which tends to be wide-ranging, was found south of the Petitot River and 18 km north of the BC/NT border during the March 2015 and March 2016 surveys, respectively. No caribou mortalities

[5] SCEK137 was heard transmitting a normal VHF beacon from the vicinity of Midwinter Lake, in the central portion of the Calendar Range, during the April 2017 telemetry flight.

were detected, therefore 14 active radio-collared caribou contributed to the March 2017 Calendar survey.

On March 31, 2017, we counted 55 caribou (39F, 10M, 6Cf) in 11 groups, including 4 SCEK caribou (SCEK112, SCEK125, SCEK134, SCEK180) found in separate groups, totalling 16 caribou, in the NT (Table 3, Appendix V). None of the collared caribou located in the NT had a calf at heel. We did not encounter any unmarked groups during the survey. The overall mean group size was 5.0 ± 2.4 SD (range 2-9), with a ratio of 15 calves:100 cows.

Maxhamish Range

We attempted to locate 28 SCEK-collared caribou that were potentially present in the Maxhamish Range during the March 30, 2017 survey (Appendix VI), including SCEK062, which was collared in the Kotcho Core Area of the Snake-Sahtaneh Range and subsequently moved to Kiwigana, and 5 GPS collars that had reached the end of their expected battery life or failed prematurely during Year V (Appendix I). SCEK085, SCEK175, and SCEK176 reached the end of their battery life and were not transmitting GPS data or a VHF beacon at the time of the survey. However, all 3 were located visually in groups with other collared caribou; their identification was confirmed based on collar type/eartag configuration. Two Vertex collars deployed in February 2016 failed prematurely in Year V (SCEK169B, SCEK225) and a third new Vertex collar (SCEK232) malfunctioned and was not transmitting GPS data or a VHF signal during March 2017. SCEK169B was not found during the March 30 survey, but SCEK225 was located visually in a group with another collared animal. SCEK232 was not found during the March survey, but its VHF signal was detected during the April 2017 telemetry flight. Two Lotek VHF collars originally deployed in the Maxhamish Range by MFLNRORD in 2009 (BC1014; Capot-Blanc) and 2010 (BC1033; Fortune) were not heard during the survey. As their VHF beacons were not detected in subsequent telemetry flights, we assume the collars have reached the end of their battery lives (Appendix I). A mortality signal from SCEK004/BC1050 (Lotek VHF), which was collared in Kiwigana in December 2012 and moved to Fortune in 2013, was detected and investigated during the March 30 survey. Therefore, 19 active radio-collars contributed to the 2017 Maxhamish Range survey.

We counted 74 caribou (50F, 16M, 8Cf) in 12 groups during the March 30, 2017 survey of the Maxhamish Range (Table 3, Appendix VI). We did not encounter any uncollared groups. Mean group size was 6.2 ± 3.4 SD (range 2-13), with a ratio of 16 calves:100 cows.

Prophet Core Area (Westside Fort Nelson Range)

Six SCEK caribou were potentially present in the Prophet Core Area of the Westside Fort Nelson Range prior to the March 2017 survey, including SCEK148 (Lotek VHF), which was collared in the Clarke Core Area of the Snake-Sahtaneh Range in March 2013. This caribou, which travelled between Clarke and the CNCA on multiple occasions between 2013 and 2016, moved to Prophet in fall 2016 and was found there during the March 2017 survey. SCEK161B/BC1059 was initially collared outside the Prophet Core Area in February 2011, prior to commencement of the SCEK telemetry project, and was subsequently recaptured and recollared in Prophet in April 2013 and March 2015. The caribou, which has made multiple movements between Prophet and the CNCA, was located in the CNCA during the March 29, 2017 survey (see Appendix III). SCEK051/BC1060 (Lotek VHF; MI-114) was detected transmitting a mortality signal and confirmed dead during the Prophet survey. Therefore, 4 of 6 potentially active radio-collars contributed to the 2017 Prophet survey.

We counted a total of 18 caribou (16F, 1M, 1Cf) in 3 groups during the March 29, 2017 survey of the Prophet Core Area (Table 3, Appendix VII). No uncollared groups were found. Mean group size was 6.0 ± 2.0 SD (range 4-8), with a ratio of 6 calves:100 cows.

Parker Core Area (Westside Fort Nelson Range)

Seven SCEK caribou were potentially present in the Parker Core Area of the Westside Fort Nelson Range prior to the March 2017 recruitment survey, including 2 animals collared in February 2016 (SCEK237, SCEK238) whose Vertex GPS collars failed prematurely and were not transmitting GPS data or VHF signals at the time of the survey (Appendix VIII). SCEK237 was not found during the survey, however, SCEK238 was located visually in a group with SCEK194 and its identification confirmed by collar type/eartag configuration. SCEK010/BC1039 (Lotek VHF; MI-113) and SCEK012/BC1041 (Lotek VHF; MI-112) were detected transmitting mortality signals and confirmed dead during the March 28 survey. Therefore, 3 active radio-collars contributed to the 2017 Parker survey.

On March 28, 2017, we counted 23 caribou (15F, 3M, 5Cf) in 4 groups in the Parker Core Area, including 1 unmarked group encountered incidentally (Table 3, Appendix VIII). Mean group size was 5.8 ± 1.3 SD (range 4-7), with a ratio of 33 calves:100 cows.

Fort Nelson Core Area (Westside Fort Nelson Range)

Three SCEK caribou were potentially present in the Fort Nelson Core Area of the Westside Fort Nelson Range in late winter 2017, including SCEK167 whose collar had reached the end of its normal battery life and was not transmitting GPS data or a VHF signal (Appendix I). SCEK009B/BC1055 and SCEK166 were located in separate groups during the March 28 survey (Appendix IX). SCEK167 was located visually in the group with SCEK009B/BC1055 and its identification was confirmed by collar type/eartag configuration. Therefore, 2 active radio-collars contributed to the 2017 Fort Nelson Core Area survey.

On March 28, 2017, we counted 10 caribou (5F, 3M, 2Cf) in 2 groups in the Fort Nelson Core Area (Table 3, Appendix IX). We did not find any uncollared groups. Mean group size was 5.0 ± 1.4 SD (range 4-6). As less than 10 adult females were located, calf recruitment was not estimated for the Fort Nelson Core Area.

3.2.1 Incidental Observations

Incidental observations made during the March 21-31, 2017 recruitment survey are found in the individual range survey results in Appendices II to IX. Poor sighting conditions and warmer temperatures may have contributed to the relatively few observations of other species. Notable observations include:

- Moose
    - 27 moose (21 unclassified adults, 3 females, 3 calves) were observed incidentally within all ranges combined.
- White-tailed deer
    - 10 white-tailed deer were seen in a field to the south of the Milligan Core Area boundary.
- Wolves
    - 2 wolves from the Big Arrow Pack were seen bedded in the Milligan Core Area, including BW002 (Lotek VHF); tracks in the vicinity suggest the wolves were hunting snowshoe hare.
    - During the March 28 survey of the Clarke Core Area, 4 wolves from the Elleh Pack, including BW038, were observed to have an adult black bear treed in a mature white spruce. We returned to the site on the following day; the bear and the wolves were not present and there was no evidence that the bear had been killed. Later in the day of March 29, we found the 4 Elleh Pack wolves (3 black, 1 grey; including BW038) in the Clarke Core Area, approximately 17 km from the previous day's location and within 500 m of 2 bedded moose.

- Wolverine
    - 1 wolverine was seen in close proximity to a group of caribou in the Maxhamish Range.
- Snowmobile tracks were observed in the Clarke and Parker core areas.
- Caribou made extensive late winter use of lakes in some areas, with almost all small lakes in the southwest portion of the Clarke Core Area covered with abundant caribou tracks.

4 SUMMARY

At the end of Year V, 106 radio-collared caribou remained active within BC's boreal caribou ranges, including 105 SCEK caribou (54 Vectronic Vertex GPS, 51 Lotek VHF) and 1 MFLNRORD caribou (Lotek VHF). These active collars represent an average of 22% of the minimum number of caribou counted by range during the 2017 recruitment survey (Table 4). As noted in Section 3.1, an increasing number of these remaining collars are approaching the end of their battery life.

Table 4. Proportion of boreal caribou collared by range at the end of Year V (April 30, 2017) based on the March 2017 recruitment survey minimum counts.

Range	Chinchaga		Snake-Sahtaneh	Calendar[1]	Maxhamish	Westside Fort Nelson			Total
	CHIN	CNCA				PPH	PRK	FN	
Minimum Count March 2017	108	42	169	43	74	18	23	10	487
No. Collars Active April 30, 2017	19	6	40	15	18	3	3	2	106
% of Min Count[2] Collared	18 %	14 %	24 %	35 %	24 %	17 %	13 %	20 %	22 %

[1] Minimum count based on caribou in Calendar Range on March 31, 2017 and 4 SCEK caribou in NT
[2] Minimum count from March 2017 survey

4.1 Caribou Survival and Mortality

One hundred and eight radio-collared boreal caribou (101 SCEK, 7 MFLNRORD) deaths were investigated between the start of the project, in December 2012, and April 30, 2017. An additional 9 uncollared caribou were encountered incidentally in mid to late winter of Year I (Feb-April 2013). Seventy-six percent of these 117 caribou deaths were due to predation, including 78 confirmed wolf kills, 8 suspected wolf kills, and 3 wolverine kills. Six natural deaths were related to poor condition or

disease, including 2 animals that were retrieved intact and delivered to the Provincial Wildlife Veterinarian for necropsy. Two caribou were apparently harvested legally by indigenous hunters from Fort Liard, NT, and one animal suffered an accidental death. The cause of death was not confirmed for 15 animals, including 4 that likely died from poor condition/disease but the state of their carcasses did not allow confirmation. In several cases it was not possible to determine whether death was the result of predation or if the caribou died and was later scavenged, including 5 sites where evidence of bear foraging was found. Site investigations and collar recovery for 4 VHF-collared caribou (SCEK027, SCEK053, SCEK010/BC1039, SCEK045/BC1045) were not conducted as of April 30, 2017.

Table 5 compares the standardized annual finite survival for radio-collared adult female caribou over the course of the project.

Table 5. Standardized finite annual survival of radio-collared adult female boreal caribou in northeastern British Columbia, May 1, 2013 to April 30, 2017 (based on the Kaplan-Meier staggered entry design).

Year[1]	Time Period	No. Adult Female Caribou Radio-Collared in Entire Time Period	Finite Survival Rate
II	May 1, 2013 - April 30, 2014	209	0.73 ± 0.03 SE (95% C.I. = 0.67 to 0.80)
II	May 1, 201 - April 30, 2015	180	0.86 ± 0.03 SE (95% C.I. = 0.81 to 0.91)
IV	May 1, 2015 - April 30, 2016	168	0.87 ± 0.03 SE (95% C.I. = 0.84 to 0.93)
V	May 1, 2016 - April 30, 2017	146	0.89 ± 0.03 SE (95% C.I. = 0.84 to 0.95)

[1] Year I of the project encompassed the initial winter capture season (December 17, 2012 to April 30, 2013)

4.2 Calf Recruitment and Population Trend

Based on a March 2017 overall recruitment rate (i.e., all ranges combined) of 21 calves:100 cows and the 2016-2017 standardized finite adult female survival rate of 0.89, lambda equals 0.99, which suggests BC's boreal caribou population remained roughly stable during Year V.

Table 6 compares annual calf recruitment over the course of the study (Culling and Culling 2013, 2014, 2015, 2016).

Table 6. Comparison of annual calf recruitment (calves:100 cows) in BC's boreal caribou ranges based on March 2013 through March 2017 SCEK late winter surveys.

Range/Core Area	March 2013	March 2014	March 2015	March 2016	March 2017
Chinchaga Range[1]	14	10	9	18	19
Milligan/Etthithun	12	7	9	17	18
CNCA (Chinchaga RRA)	33	19	8	21	22
Snake-Sahtaneh[2]	24	11	18	18	27
Calendar - All[3]	35	13	22	26	15
Maxhamish	28	10	21	29	16
Prophet Core Area (WSR)[4]	19	10	0	15	6
Parker Core Area (WSR)[4]	4	32	8	15	33
Fort Nelson Core Area (WSR)[4]	0	n/a[5]	n/a[5]	n/a[5]	n/a[5]
Overall calves:100 cows	21	12	15	20	21

[1] Milligan, Etthithun, and CNCA (Chinchaga RRA) combined

[2] Adjusted for adult male SCEK173/BC1037

[3] Including all caribou in groups with SCEK-collared caribou (including groups located in NT or AB)

[4] WSR - Westside Fort Nelson Range

[5] Ranges with less than 10 adult females observed excluded

4.3 Recommendations

Winter calf recruitment surveys have been conducted in late March to provide an estimate of calf survival to roughly 10 months of age. However, late winter weather conditions in BC's boreal caribou ranges are becoming increasingly unpredictable, with what formerly was considered unseasonably warm temperatures now becoming common. Patchy snow conditions and relatively high air temperatures may affect the efficiency of surveys by reducing sightability for both collared animals and incidental observations of uncollared caribou groups. As well, high temperatures may result in fewer observations of non-target species as moose and wolves seek mid-day shade. While high temperatures and snow melt have also been experienced in early March during the project, shifting future surveys to the beginning of the month may increase the chances of having optimal survey conditions.

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APPENDICES

Appendix I: GPS radio-collars confirmed to have ceased functioning during Year V (May 1, 2016-April 30, 2017)

ID	Range[1]	Core Area[2]	Collar Type[3]	Date Collar Deployed	Last GPS Data Transmitted	VHF Signal Status on April 30, 2017	Comments
SCEK034	CHIN	MLL	VERTEX	20-Jan-2013	07-Dec-15	Expired	
SCEK038B	CHIN	MLL	VERTEX	19-Feb-2016	19-Oct-16	Expired	Original collar released and caribou retired from study in Feb 2015; animal randomly recaptured and collared second time in Feb 2016 but Vertex collar failed prematurely October 2016
SCEK040	CHIN	ETT	VERTEX	21-Jan-13	22-Jun-16	Expired	
SCEK055	CHIN	MLL	VERTEX	31-Jan-13	15-Mar-16	Expired	GPS data ceased March 2016; VHF beacon last heard March 2016 survey
SCEK071	SNS	KOT	VERTEX	03-Feb-13	27-Jun-15	Expired	Confirmed VHF signal expired during Year V
SCEK085	MAX	FRT	VERTEX	05-Feb-13	27-Feb-16	Expired	
SCEK111	SNS	KOT	VERTEX	25-Feb-13	10-Jul-16	Expired	
SCEK119	CAL	CAL	VERTEX	26-Feb-13	13-Jun-16	Expired	
SCEK135	CAL	CAL	VERTEX	28-Feb-13	12-Aug-16	Expired	
SCEK142	CHIN	CNCA	VERTEX	01-Mar-13	12-Jun-16	Expired	
SCEK167	WSR	FN	LFC	28-Feb-14	29-Aug-16	Expired	
SCEK169B	MAX	KWG	VERTEX	16-Feb-16	3-Jun-16	Expired	Premature collar failure
SCEK172	CHIN	CNCA	LFC	1-Mar-2014	20-Jul-16	Expired	
SCEK173/ BC1037	SNS	KOT	IRIDIUM	1-Mar-2014	28-Jul-15	Expired	Adult male; originally collared by FLNRO in March 2010; replaced VHF collar with ATS Iridium in March 2014; Iridium collar failed - GPS data ceased July 28, 2015, with VHF beacon last heard October 2015 but continued to monitor through Year V
SCEK175	MAX	FRT	LFC	2-Mar-2014	18-Sep-16	Expired	
SCEK176	MAX	FRT	LFC	2-Mar-2014	8-Aug-16	Expired	
SCEK185	CAL	CAL	LFC	4-Mar-2014	20-Jun-16	Expired	
SCEK187	SNS	KOT	LFC	4-Mar-2014	24-Jun-16	Expired	
SCEK191	SNS	CLK	LFC	5-Mar-2014	17-Sep-16	Expired	
SCEK192	SNS	CLK	LFC	5-Mar-2014	23-Sep-16	Expired	
SCEK197	CHIN	MLL	LFC	6-Mar-2014	15-Aug-16	Expired	
SCEK204	SNS	KOT	LFC	31-Mar-2014	26-Jun-16	Expired	
SCEK225	MAX	CPB	VERTEX	16-Feb-2016	27-Feb-17	No signal	Premature collar failure; located visually in collared group during March 2017 recruitment survey
SCEK228	SNS	KOT	VERTEX	24-Feb-2016	9-Jul-16	No signal	Premature collar failure
SCEK234	CAL	CAL	VERTEX	25-Feb-2016	26-Jun-16	No signal	Premature collar failure
SCEK236	CHIN	CNCA	VERTEX	26-Feb-2016	15-May-16	No signal	Premature collar failure
SCEK237	WSR	PRK	VERTEX	27-Feb-2016	25-Dec-16	No signal	Premature collar failure
SCEK238	WSR	PRK	VERTEX	27-Feb-2016	5-Apr-17	No signal	Premature collar failure

[1] CHIN – Chinchaga SNS – Snake-Sahtaneh CLN – Calendar MAX – Maxhamish WSR - Westside Range

[2] MLL – Milligan ETT – Etthithun CNCA – Chinchaga North Core Area CLR – Clarke KOT – Kotcho CAL – Calendar KWG – Kiwigana FRT – Fortune CPB – Capot-Blanc PRK – Parker FN – Fort Nelson

[3] VERTEX -Vectronic Vertex LFC – Lotek LifeCycle IRIDIUM – ATS Iridium

Appendix II: Chinchaga late winter recruitment survey, March 21, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga Range

Observation Date: March 21, 2017

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth (cm)	Snow Cover
Start (March 21)	08:00	> 50%	➢ 10 knots	- 8 C	None	31-50	76-100 %
End (March 21)	13:00	Clear	15 knots	+ 2C	None	Days since 5 cm Snow: < 3	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Cam Allan Observer: Wally Attachie (DRFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK026B	MLL	GPS	No	1	8	6	1	1	0	0	10	669817	6296754	BB	
SCEK029	MLL	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 in MLL, ETT or in CNCA during survey but located in MLL in April 2017 telemetry flight
SCEK032	MLL	VHF	No	14	6	6	0	0	0	0	10	635908	6370132	BL	
SCEK033B	MLL	GPS	No	5	8	8	0	0	0	0	10	653403	6322399	BA	Mature mixedwood (aspen/pine/spruce)
SCEK035	MLL	VHF	No	9	5	5	0	0	0	0	10	675107	6330999	BB	Group includes unid old VHF collar (yellow right ear tag); was also in same group as unid eartag during 2016 survey
SCEK036B	MLL	GPS	No	18	5	3	1	1	0	1	10	614253	6367403	BL	

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga Range
Observation Date: March 21, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK038B	MLL	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 heard or seen; premature Vertex collar failure - not transmitting GPS data or VHF signal; (C1)
SCEK040	ETT	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C2)
SCEK041	MLL	VHF	Yes	13	7	6	0	1	0	0	10	638112	6363213	BL	
SCEK053	MLL	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	672458	6348436	BB	Mortality (C3)
SCEK054	MLL	VHF	No	12	2	2	0	0	0	0	10	639909	6366235	BL	Appears to have lost eartag
SCEK057	MLL	VHF	No	15	8	7	0	1	0	0	10	627215	6372338	BA	Mature mixedwood (aspen/pine/spruce)
SCEK059	MLL	VHF	Yes	4	9	7	1	1	0	0	10	651388	6320024	BA	Mature mixedwood (aspen/pine/spruce)
SCEK060	MLL	VHF	No	17	5	5	0	0	0	0	10	613341	6368384	BB	
SCEK061	MLL	VHF	No	6	6	4	0	2	0	0	10	653303	6322944	BB	
SCEK195	ETT	GPS	Yes	11	6	2	3	1	0	2	10	650388	6410443	BB	Abundant wolf tracks in area
SCEK196	MLL	GPS	No	16	1	1	0	0	0	0	10	628534	6367353	BB	

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga Range
Observation Date: March 21, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK197	MLL	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C4)
SCEK198	MLL	GPS	No	7	5	5	0	0	0	0	10	647513	6305961	BB	In PeeJay area
SCEK201	MLL	GPS	Yes	2	8	6	0	2	0	0	10	670414	6293972	TF	Tamarack-scrub birch dominated wetland (fen)
SCEK223	MLL	GPS	Und	8	4	3	0	1	0	0	10	644904	6304320	CV	Bedded in field at PeeJay
SCEK224	ETT	GPS	Yes	10	3	1	1	1	0	0	10	651550	6408134	BB	Abundant wolf tracks in area
SCEK226	MLL	GPS	No	3	12	7	2	3	0	2	10	662184	6304693	BB	Abundant caribou tracks on adjacent lake
Unid #1	MLL	VHF	n/a	(9)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	675107	6330999	BB	Unidentified VHF collar (yellow right ear tag); group included SCEK035 (caribou were also together in 2016 survey)

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga Range
Observation Date: March 21, 2017

Obs #	UTM	Chinchaga Range Additional Observations
1	10.661329.6283205	Moose x 4 and WT deer x 10 in field to south of Milligan boundary
2	10.614683.6353357	Wolf BW002 (Lotek VHF); Big Arrow Pack; visual of 2 x grey wolves (bedded) in Milligan; appear to be hunting snowshoe hare
3	10.646035.6307496	Moose x 2 adults
4	10.647109.6303679	Moose x 1 adult
Comments		
C1	SCEK038B was not heard or seen during the 2017 survey; Vertex collar failed prematurely and was not transmitting GPS data or VHF signal; last transmitted GPS data Oct 19, 2016; original collar released and caribou retired (collar retrieved Feb 2015), then randomly recaptured and collared second time in Feb 2016	
C2	SCEK040 was not heard or seen during the 2017 survey; collared in January 2013; battery expired - not transmitting GPS data or VHF signal; last transmitted GPS data June 22, 2016; VHF signal not detected on April 2017 telemetry flight	
C3	SCEK053 (Lotek VHF) mortality detected during the 2017 survey (MI-111); no landing site therefore collar not retrieved; based on low-level aerial inspection it appears that the carcass had been consumed	
C4	SCEK197 was not heard or seen during the 2017 survey; collared in March 2014; battery expired - not transmitting GPS data or VHF signal; last transmitted GPS data August 15, 2016; VHF signal not detected on April 2017 telemetry flight	
CX1	Scanned for VHF collar AB149.391, presumed to have failed or returned to Alberta – not hear or seen therefore delete from future scan list	

[1] MLL – Milligan ETT - Etthithun
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine BA - Boreal White Spruce-Trembling Aspen TF - Tamarack Wetland
CV – Cultivated Field TR - Trail (cutline)

Appendix III: Chinchaga North Core Area (Chinchaga RRA) late winter survey, March 29, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga North Core Area
Obs Date: March 29, 2017

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 29)	13:13	Clear	Calm	+ 4 C	None	26-50 cm	76-100 %
End (March 29)	14:55	Clear	10 knots	+ 5 C	None	Days since 5 cm Snow: < 14 days	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needlay (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK048	CNCA	VHF	No	2	6	5	0	1	0	0	10	624534	6454749	BL	Group included SCEK161B
SCEK142	CNCA	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C1)
SCEK161B/ BC1059	PPH to CNCA	GPS	No	(2)	dupl	dupl	dupl	dupl	dupl	dupl	10	624534	6454749	BL	Group included SCEK048; SCEK161B/BC1059; collared outside Prophet, moves between Prophet and CNCA; in CNC during 2017 survey; (C2)
SCEK170B	CNCA	GPS	Yes	5	2	1	0	1	0	0	10	638739	6451121	BB	
SCEK172	CNCA	GPS	No	1	8	8	0	0	0	0	10	611314	6453053	BB	Battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK213 and SCEK236; (C3)

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga North Core Area
Obs Date: March 29, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK189	CNCA	GPS	No	4	5	3	1	1	0	1	10	619499	6462623	TF	Tamarack-scrub birch dominated wetland (fen)
SCEK213	CNCA	GPS	No	(1)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	611314	6453053	BB	Group included SCEK172 and SCEK236; caribou was also found in group with SCEK236 during March 2016 survey)
SCEK214	CNCA	GPS	No	3	8	6	1	1	0	0	10	625213	6458861	TF	Tamarack-scrub birch dominated wetland (fen)
SCEK215	CNCA	GPS	No	6	13	9	1	3	0	0	10	644133	6459421	TF	Tamarack-scrub birch dominated wetland (fen)
SCEK236	CNCA	GPS	No	(1)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	611314	6453053	BB	Premature collar failure - not transmitting GPS data or VHF signal but located visually in group with SCEK172 and SCEK213; (C4)

Obs #	UTM	Chinchaga North Core Area Additional Observations
1	10.639764.6459996	Moose x 2 (1F + calf); uncollared
2	10.644177.6458692	Moose x 2 (1F + calf); uncollared

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Chinchaga North Core Area
Obs Date: March 29, 2017

	Comments
C1	SCEK142 was not heard or seen during the 2017 survey; collared in March 2013; battery expired - not transmitting GPS data or VHF signal; last transmitted GPS data June 12, 2016; VHF signal not detected on April 2017 telemetry flight
C2	SCEK161B/BC1059 was collared outside Prophet 3 times (Feb 2011, April 2013, March 2015); caribou moves between Prophet and CNCA; located in CNCA in March 2017 survey
C3	SCEK172 was collared in March 2014; battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK213 and SCEK236 (ID confirmed by collar/eartag configuration); last GPS data transmitted on July 20, 2016; VHF signal not detected on April 2017 telemetry flight
C4	SCEK236 was collared in Feb 2016; Vertex collar failed prematurely - not transmitting GPS data or VHF signal but located visually during March 2017 survey in group with SCEK172 and SCEK213 (ID confirmed by collar/eartag configuration); caribou was also with SCEK213 during March 2016 survey; last GPS data transmitted May 15, 2016; VHF signal not detected on April 2017 telemetry flight
CX1	SCEK029 was collared in MLL and moves between MLL and CNCA; the caribou was not heard or seen in or between MLL, ETT or CNCA during the March 2017 survey but was heard in MLL during the April 2017 telemetry flight.

[1] CNCA - Chinchaga North Core Area
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine TF – Tamarack Wetland

Appendix IV: Snake-Sahtaneh late winter survey, March 28-31, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Obs Day: 1/4	**Time**	**Cloud Cover**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 28)	11:17	Unbroken	4 knots	- 8 C	None	26 - 50cm	76-100 %
End (March 28)	13:11	Unbroken	5 knots	- 1 C	None	Days since 5 cm Snow: < 1/2	
Obs Day: 2/4	**Time**	**CC**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 29, 2017)	15:10	Unbroken	8 knots	+ 5 C	None	26 - 50 cm	76-100 %
End (March 29, 2017)	17:15	> 50 %	10 knots	+ 6 C	None	Days since 5 cm Snow: < 3	
Obs Day: 3/4	**Time**	**CC**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 30, 2017)	14:40	Unbroken	8 knots	+ 7 C	None	26 - 50 cm	76-100 %
End (March 30, 32017)	16:55	> 50 %	10 knots	+ 7 C	None	Days since 5 cm Snow: < 3	
Obs Day: 4/4	**Time**	**CC**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 31, 2017)	14:25	Unbroken	8 knots	+ 10 C	None	26 - 50 cm	76-100 %
End (March 31, 32017)	17:30	> 50 %	10 knots	+ 11 C	None	Days since 5 cm Snow: < 3	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needley (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
SCEK019	CLR	VHF	Yes	7	5	4	0	1	0	0	10	576087	6506766	BB	
SCEK020B	CLR	GPS	Yes	12	5	3	0	2	0	0	10	607915	6491350	BB	
SCEK024	CLR	VHF	No	5	2	2	0	0	0	0	10	569358	6499893	BB	Group included SCEK070
SCEK025 / BC1056	CLR	VHF	Yes	1	4	2	1	1	0	0	10	548771	6490690	BB	
SCEK068	CLR	VHF	No	8	10	7	3	0	0	0	10	567871	6493159	TF	Group included SCEK239; tamarack-scrub birch dominated wetland (fen); recreational snowmobile tracks in vicinity

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
SCEK070	CLR	VHF	No	(5)	dupl	dupl	dupl	dupl	dupl	dupl	10	569358	6499893	BB	Group included SCEK024
SCEK071	KOT	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C1)
SCEK079B	TSE	GPS	No	22	4	3	1	0	0	0	10	558415	6592995	BB	
SCEK081	TSE	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	548318	6594625	BL	Mortality (MI-116); (C2)
SCEK082	TSE	VHF	No	18	7	1	6	0	0	3	10	554197	6592054	BB	
SCEK088	KOT	VHF	No	32	4	3	1	0	0	1	10	613683	6572567	BB	
SCEK089	KOT	VHF	No	35	1	1	0	0	0	0	10	594354	6574771	BB	
SCEK090	KOT	VHF	Yes	37	4	3	0	1	0	0	10	615400	6576449	TR	On cutline through mature Sb/LP (BL)
SCEK091	KOT	VHF	No	36	5	4	0	1	0	0	10	597773	6575167	BB	
SCEK092	KOT	VHF	No	27	4	4	0	0	0	0	10	616677	6562642	TF	Tamarack-scrub birch dominated wetland (fen)
SCEK096	KOT to CLR	VHF	No	15	4	3	1	0	0	1	10	582520	6473907	BB	Collared in KOT, moved to CLR
SCEK097B	KOT	GPS	No	31	4	3	0	1	0	0	10	612181	6568526	BB	
SCEK100B	KOT	GPS	Yes	26	2	1	0	1	0	0	10	639848	6565520	TF	

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
SCEK103	KOT	VHF	No	25	7	5	0	2	0	0	10	636766	6564657	BB	Group included SCEK105 and SCEK204 (caribou was also with SCEK204 during March 2016 survey)
SCEK105	KOT	VHF	Yes	(25)	dupl	dupl	dupl	dupl	dupl	dupl	10	636766	6564657	BB	Group included SCEK103 and SCEK204
SCEK111	KOT	GPS	No	33	7	5	2	0	0	1	10	592794	6565103	BL	Battery expired - not transmitting GPS data or VHF signal, but located visually in group with SCEK186; (C3)
SCEK127	TSE	VHF	No	24	5	5	0	0	0	0	10	555153	6608288	BB	
SCEK131	TSE	VHF	No	21	7	3	4	0	0	4	10	558206	6593152	BB	
SCEK132	TSE	VHF	No	17	3	3	0	0	0	0	10	551236	6597627	BL	
SCEK145	CLR	VHF	Yes	38	5	2	1	2	0	0	10	612006	6553074	BB	Collared in CLR, moves between CLR and KOT
SCEK148	CLR to PPH	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	Collared in CLR, located in PPH on March 29 survey; (C4)
SCEK149	CLR	VHF	No	3	2	2	0	0	0	0	10	571223	6498018	BB	Group included SCEK218
SCEK150	CLR	VHF	Yes	10	6	4	1	1	0	0	10	603926	6477090	TF	
SCEK152	CLR	VHF	Yes	11	6	4	0	2	0	0	10	604655	6490873	LS	On small lake
SCEK156	CLR	VHF	Yes	2	3	1	1	1	0	1	10	558992	6500268	BB	
SCEK157	CLR	VHF	No	9	4	3	1	0	0	0	10	565928	6478255	BB	Group included SCEK240

Project: SCEK Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
SCEK186	KOT	GPS	No	(33)	dupl	dupl	dupl	dupl	dupl	dupl	10	592794	6565103	BL	Group included SCEK111 (failed Vertex collar)
SCEK187	KOT	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C5)
SCEK191	CLR	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C6)
SCEK192	CLR	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C7)
SCEK193	CLR	GPS	No	6	1	1	0	0	0	0	10	568776	6499551	BB	
SCEK204	KOT	GPS	No	(25)	dupl	dupl	dupl	dupl	dupl	dupl	10	636766	6564657	BB	Battery expired; not transmitting GPS data or VHF signal but located visually in group with SCEK103 and SCEK105; caribou was also with SCEK103 in March 2016 survey; (C8)
SCEK209	KOT to KWG	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	Located in KWG (MAX Range) on March 30, 2017
SCEK218	CLR	GPS	No	(3)	dupl	dupl	dupl	dupl	dupl	dupl	10	571223	6498018	BB	Group included SCEK149

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
SCEK219	TSE	GPS	No	16	3	3	0	0	0	0	10	551772	6609448	BL	Collared in WSK; found between TSE and KWG in March 2016 survey
SCEK220	CLR	GPS	Yes	13	4	2	0	2	0	0	10	605138	6486748	BB	
SCEK228	KOT	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 heard or seen; premature Vertex collar failure - not transmitting GPS data or VHF signal; (C9)
SCEK229	KOT	GPS	Yes	28	2	1	0	1	0	0	10	611496	6569703	BL	
SCEK230	KOT	GPS	Yes	34	7	5	1	1	0	0	10	594276	6575941	BL	
SCEK233	TSE	GPS	Yes	20	8	4	2	2	0	0	10	557342	6593538	BB	
SCEK239	CLR	GPS	No	(8)	dupl	dupl	dupl	dupl	dupl	dupl	10	567871	6493159	TF	Group included SCEK068; tamarack-scrub birch dominated wetland (fen); recreational snowmobile tracks in vicinity
SCEK240	CLR	GPS	No	(9)	dupl	dupl	dupl	dupl	dupl	dupl	10	565928	6478255	BB	Group included SCEK157
BC1028	TSE	VHF	No	23	3	3	0	0	0	0	10	561942	6597109	BB	Group included unidentified older VHF collared caribou with no eartags; (C10)
Uncoll#1	CLR	n/a	n/a	4	7	4	0	3	0	0	10	569674	6499036	BB	
Uncoll#2	CLR	n/a	n/a	14	3	2	1	0	0	0	10	601782	6489747	BB	
Uncoll#3	TSE	n/a	n/a	19	4	2	0	2	0	0	10	556962	6593229	BB	

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Unc	mm					
Uncoll#4	KOT	n/a	n/a	29	2	1	0	1	0	0	10	613243	6568651	BB	
Uncoll#5	KOT	n/a	n/a	30	5	2	1	2	0	0	10	612469	6568358	BB	

Snake-Sahtaneh Additional Observations

Obs #	UTM	Observation
1	10.556395.6491058	March 28: Elleh Pack wolves x 4 including BW038 in Clarke; had mature black bear treed in mature SP/LP forest; checked site on following day - bear and wolves both gone (wolf signals not heard) and no sign that bear had been killed
2	10.568115.6493478	Moose x 1 adult
3	10.568048.6480337	Moose x 3 (2adult females, 1 calf)
4	10.598396.6509129	Moose x 2 adults (outside Clarke)
5	10.543899.6502575	Moose x 2 adults (within approx. 500 m of BW038)
6	10.543813.6502074	March 29: Elleh Pack wolves x 4 (3 black, 1 uncollared grey) including BW038 in Clarke; pack located approx. 17 km from previous days' location and within approx. 500 m of 2 bedded moose (see above)
7	10.558663.6593197	Moose x 1 adult

Comments

C1	SCEK071 was collared in Feb 2013; battery expired - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data was transmitted June 27, 2015; VHF signal not detected on April 2017 telemetry flight
C2	SCEK081 mortality was detected and investigated during the March 30 survey (MI-116); Tsea Core Area; confirmed wolf kill
C3	SCEK111 was collared in Feb 2013; battery expired - not transmitting GPS data or VHF signal, but was located visually in group with SCEK186 (ID confirmed by collar type/eartag configuration); last GPS data transmitted July 10, 2016; VHF signal not detected on April 2017 telemetry flight
C4	SCEK148 was collared in CLR in March 2013 and moved between CLR and CNCA, then moved to PPH in fall 2016; located in PPH during March 2017 survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Snake-Sahtaneh Range
Obs Date: March 28-31, 2017

C5	SCEK187 was collared in March 2014; battery expired - not transmitting GPS data or VHF signal; was not heard or seen during March 2017 survey; last GPS data transmitted July 24, 2016; VHF signal was not detected on April 2017 telemetry flight
C6	SCEK191 was collared in March 2014; battery expired - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data transmitted Sept 17, 2016; VHF signal not detected on April 2017 telemetry flight
C7	SCEK192 was collared in March 2014; battery expired - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data transmitted Sept 23, 2016; VHF signal not detected on April 2017 telemetry flight
C8	SCEK204 was collared in March 2014; battery expired - not transmitting GPS data or VHF signal but was located visually in group with SCEK103 and SCEK105; ID confirmed by collar type/eartag configuration; caribou was also in group with SCEK103 in March 2016 survey; last transmitted GPS data June 26, 2016; VHF signal not detected on April 2017 telemetry flight
C9	SCEK228 was collared in Feb 2016; Vertex collar failed prematurely - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data transmitted July 9, 2016; VHF signal not detected on April 2017 telemetry flight
C10	MFLNRORD Lotek VHF collar is on the same frequency as Nexen wolf BW047; both collars should be nearing end of their battery life
CX1	Searched for SCEK173 (bull) in SNS and adjacent ranges; not heard or seen; battery expired - last GPS data transmitted July 28, 2015 and VHF not detected since Oct 2015; continue to search for animal during future surveys for opportunity to remove radio-collar
CX2	Almost all small lakes in the southwest portion of the Clarke Core Area were covered with abundant caribou tracks

[1] CLR - Clarke PRD - Paradise KOT – Kotcho (includes previous West, East and North polygons) 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 TF – Tamarack Fen TR - Trail (cutline)

Appendix V: Calendar late winter survey, March 31, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Calendar Range
Obs Date: March 31, 2017

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 31)	09:10	Scattered > 50%	Calm	+ 3 C	None	26-50 (C1)	76-100 %
End (March 31)	14:15	Scattered > 50%	Moderate Breeze	+ 7 C	None	Days since 5 cm Snow: < 14	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needley (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK107	CAL	VHF	No	3	4	3	1	0	0	1	10	647307	6653837	BB	Located just south of BC/NT border; caribou was in NT during March 2015 survey
SCEK112	NT	VHF	No	6	4	4	0	0	0	0	10	657340	6662987	BL	Located 8 km north of BC/NT border in March 2017; caribou was located ~ 10 km north of BC/NT border and at headwaters of Shekelie drainage (BC) during March 2016 and March 2015 surveys, respectively); using mature Sb/LP
SCEK113	CAL	VHF	No	9	4	3	1	0	0	1	10	596436	6621134	BB	Group included SCEK183; caribou was located ~ 4 km north of BC/NT border and at the headwaters of the Shekelie drainage (AB) during March 2016 and March 2015 surveys, respectively
SCEK119	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; caribou typically spends summer in NT (C1)

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Calendar Range
Obs Date: March 31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK120	CAL	VHF	No	8	3	2	1	0	0	1	10	607415	6646316	BB	Group included SCEK123; in black spruce bog with mature Sb/LP adjacent
SCEK122	CAL	VHF	Yes	2	5	2	2	1	0	0	10	641592	6649457	BB	During previous survey (March 2016) was located approx. 13 km north of BC/NT border
SCEK123	CAL	VHF	No	(8)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	607415	6646316	BL	Group included SCEK120; in black spruce bog with mature Sb/LP adjacent
SCEK125	NT	VHF	No	5	2	2	0	0	0	0	10	659781	6671137	BL	Located 16 km north of BC/NT border; caribou regularly moves between BC and NT (as far north as Trainor Lake); in mature Sb/LP
SCEK126B	CAL	GPS	Yes	11	9	6	0	3	0	0	10	595244	6645458	BB	Group included SCEK185; during previous survey (March 2016) was approx. 20 km north of BC/NT border
SCEK134	NT	VHF	No	7	3	3	0	0	0	0	10	656769	6662238	BL	Located 7 km north of BC/NT border; caribou was south of Petitot during March 2015 survey; group located in mature Sb/LP

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Calendar Range
Obs Date: March 31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK135	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 heard or seen; battery expired - not transmitting GPS data or VHF signal; (C2)
SCEK136B	CAL	GPS	No	1	5	3	2	0	0	0	10	631085	6631594	BL	Group included SCEK181B; (caribou was also found with SCEK181B during March 2016 survey); in regenerating burn with residual patches of mature Sb/LP
SCEK137	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 during survey but VHF signal detected in April 2017 telemetry flight; (C3)
SCEK146B	CAL	GPS	Yes	10	9	6	1	2	0	1	10	597873	6642107	BB	
SCEK180	NT	GPS	No	4	7	5	2	0	0	0	10	654594	6672443	BL	Located 17 km north of BC/NT border (was south of Petitot during March 2015 survey); group in mature Sb/LP
SCEK181B	CAL	GPS	No	(1)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	631085	6631594	BL	Group included SCEK136B (was also found with SCEK136B in March 2016 survey); in regenerating burn with residual patches of mature Sb/LP

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Calendar Range
Obs Date: March 31, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK183	CAL	GPS	No	(9)	dupl	dupl	dupl	dupl	dupl	dupl	10	596436	6621134	BB	Group included SCEK113
SCEK185	CAL	GPS	No	(11)	dupl	dupl	dupl	dupl	dupl	dupl	10	595244	6645458	BB	Battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK185; (C4)
SCEK234	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	n/a	Not heard or seen – premature Vertex collar failure; not transmitting GPS data or VHF signal; (C5)

Obs #	UTM	Calendar Range Additional Observations
n/a		

Comments	
C1	SCEK119 was collared Feb 2013; battery expired - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data transmitted June 13, 2016; VHF signal not detected on April 2017 telemetry flight; caribou typically spends summer in NT
C2	SCEK135 was collared Feb 2013; battery expired - not transmitting GPS data or VHF signal; not heard or seen during March 2017 survey; last GPS data transmitted Aug 12, 2016; VHF signal not detected on April 2017 telemetry flight
C3	SCEK137 was not found during March 2017 survey but VHF signal was detected on April 2017 telemetry flight; caribou ranges over wide area so searched eastern portion of Calendar Range at high elevation to scan into Alberta; during previous survey (March 2016) was located ~ 18 km north of BC/NT border and was south of Petitot during March 2015 survey
C4	SCEK185 was collared March 2014; battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK185; ID confirmed by collar type/eartag configuration; last GPS data transmitted June 20, 2016; VHF signal was not detected during April 2017 telemetry flight
C5	SCEK234 was collared in Feb 2016; new Vertex collar failed prematurely and was not transmitting GPS data or VHF signal; not heard or seen during the March 2017 survey; last GPS data was transmitted June 26, 2016; VHF signal was not detected on April 2017 telemetry flight

[1] CAL – Calendar NT – Northwest Territories
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine LS - Small Lake TR - Trail (including cutline)

Appendix VI: Maxhamish late winter survey, March 30, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

Obs Day: 1/1	**Time**	**Cloud Cover**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 30)	08:44	Clear	Calm	- 5 C	None	51-75 (C1)	76-100 %
End (March 30)	14:30	Scattered < 50%	Light Air	+7 C	None	Days since 5 cm Snow: < 14	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needley (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK004/ BC1050	KWG to FRT	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	490272	6629837	BL	Mortality; (C1)
SCEK007B	CPB	GPS	No	5	5	5	0	0	0	0	10	466421	6575046	BL	Group included SCEK076
SCEK062	KWG	VHF	No	2	5	4	1	0	0	1	10	526119	6571294	BL	Group included SCEK064 and SCEK209
SCEK064	KWG	VHF	No	(2)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	526119	6571294	BL	Group included SCEK062 and SCEK209; (C2)
SCEK066B	CPB	GPS	Yes	6	2	1	0	1	0	0	10	466460	6574539	BB	
SCEK076	CPB	VHF	No	(5)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	466421	6575046	BL	Group included SCEK007B

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK085	FRT	GPS	Yes	10	5	4	0	1	0	0	10	540343	6626386	BB	Battery expired - not transmitting GPS data or VHF signal, but located visually in group with SCEK205; (C3)
SCEK086	FRT	VHF	No	9	11	7	4	0	0	2	10	538048	6633405	LS	Group included SCEK164; on lake
SCEK128	FRT	VHF	No	8	4	4	0	0	0	0	10	528777	6632848	BB	Group included SCEK177 (was also in group with SCEK177 during the March 2016 survey)
SCEK129	FRT	VHF	Yes	11	7	5	1	1	0	1	10	536652	6626242	BB	Group included SCEK175 and SCEK221 (was also in group with SCEK221 during the March 2016 survey)
SCEK164	FRT	VHF	No	(9)	dupl	dupl	dupl	dupl	dupl	dupl	10	538048	6633405	LS	Group included SCEK086; on lake
SCEK168	KWG	GPS	No	4	2	2	0	0	0	0	10	529304	6568923	BB	
SCEK169B	KWG	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 heard or seen; Vertex collar failed prematurely; (C4)

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK175	FRT	GPS	No	(11)	dupl	dupl	dupl	dupl	dupl	dupl	10	536652	6626242	BB	Battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK129 and SCEK221; (C5)
SCEK176	FRT	GPS	Yes	7	13	6	6	1	0	2	10	466727	6639728	BB	Battery expired - not transmitting GPS data or VHF signal, but located visually in group that included SCEK208 and SCEK225 (was also with SCEK208 during March 2016 survey); (C6)
SCEK177	FRT	GPS	No	(8)	dupl	dupl	dupl	dupl	dupl	dupl	10	528777	6632848	BB	Group included SCEK128 (was also with SCEK128 during March 2016 survey)
SCEK178	FRT	GPS	No	12	9	5	2	2	0	0	10	539112	6623007	BL	Group included SCEK206
SCEK205	FRT	GPS	No	(10)	dupl	dupl	dupl	dupl	dupl	dupl	10	540343	6626386	BB	Group included SCEK085
SCEK206	FRT	GPS	Yes	(12)	dupl	dupl	dupl	dupl	dupl	dupl	10	539112	6623007	BB	Group included SCEK178
SCEK208	FRT	GPS	No	(7)	dupl	dupl	dupl	dupl	dupl	dupl	10	466727	6639728	BB	Group included SCEK176 and SCEK225 (was also with SCEK176 during March 2016 survey)

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK209	KOT to KWG	GPS	No	(2)	dupl	dupl	dupl	dupl	dupl	dupl	10	526119	6571294	BL	Group included SCEK062 and SCEK064; collared in Kotcho, moved to Kiwigana
SCEK211	KWG	GPS	No	3	4	2	2	0	0	2	10	529408	6572680	BB	
SCEK221	FRT	GPS	No	(11)	dupl	dupl	dupl	dupl	dupl	dupl	10	536652	6626242	BB	Group included SCEK129 and SCEK175 (was also with SCEK129 during March 2016 survey)
SCEK225	CPB	GPS	No	(7)	dupl	dupl	dupl	dupl	dupl	dupl	10	466727	6639728	BB	Vertex collar failed prematurely - not transmitting GPS data or VHF signal but located visually in group with SCEK176 and SCEK208; (C7)
SCEK231/ BC1009	KWG	GPS	Yes	1	7	5	0	2	0	0	10	525644	6570182	BL	
SCEK232	KWG	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; collar malfunctioning; no GPS data or VHF signal during survey (C8)

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
BC1014	CPB	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 or seen; VHF signal not detected for several months; assumed battery expired
BC1033	FRT	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 or seen; VHF signal not detected for several months; assumed battery expired

Maxhamish Range Additional Observations

Obs #	UTM	Observation
1	10.527988.6573077	Wolverine x 1; close proximity to a group of caribou

Comments

C1	SCEK004/BC1050 (Lotek VHF) mortality was detected and investigated during the March 30, 2017 survey of the Fortune Core Area (MI-115); apparent cause of death was poor condition; returned to site on April 1 to retrieve intact carcass, which was slung to the nearest road access and delivered by vehicle to Fort St. John pending necropsy by the Provincial Wildlife Veterinarian; caribou was collared in Kiwigana in December 2012 and moved to Fortune in 2013
C2	SCEK064 was collared in Kiwigana in Feb 2013, found in Tsea during March 2016 survey, then returned to Kiwigana in Year V
C3	SCEK085 was collared in February 2013; battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK205; ID confirmed by collar type/eartag configuration; VHF beacon last heard March 2016 survey; last GPS data transmitted Feb 27, 2016; VHF signal not detected on April 2017 telemetry flight
C4	SCEK169B was recollared Feb 16, 2016; the new Vertex collar failed prematurely and was not transmitting GPS data or VHF signal; not heard or seen during the March 2017 survey; last GPS data was transmitted June 3, 2016; VHF signal not detected on April 2017 telemetry flight
C5	SCEK175 was collared March 2014; Lotek LifeCycle battery expired - not transmitting GPS data or VHF signal but located visually during March 2017 survey in group with SCEK129 and SCEK221 (ID confirmed by collar type/eartag configuration); last GPS data transmitted Sept 18, 2016; VHF signal not detected on April 2017 telemetry flight

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Maxhamish Range
Obs Date: March 30, 2017

	Comments
C6	SCEK176 was collared March 2014; Lotek LifeCycle battery expired - not transmitting GPS data or VHF signal but located visually in group that included SCEK208 and SCEK225 (ID confirmed by collar/eartag configuration; was also with SCEK208 during March 2016 survey; last GPS data transmitted Aug 8, 2016; VHF signal not detected on April 2017 telemetry flight (C5)
C7	SCEK225 was collared in Capot-Blanc in Feb 2016, moved to Fortune in June 2016; Vertex collar failed prematurely - not transmitting GPS data or VHF signal but located visually in group with SCEK176 and SCEK208; ID confirmed by collar/eartag configuration; last GPS data transmitted Feb 27, 2017; VHF signal not detected on April 2017 telemetry flight
C8	SCEK232 was collared in Feb 2016 but collar malfunctioned; relayed sporadic GPS data in Year V, with no GPS locations transmitted January-March 2017; caribou was not heard or seen during the March 2017 survey, but the VHF signal was detected during the April 24 2017 telemetry flight

[1] CPB - Capot-Blanc FRT - Fortune KWG - Kiwigana KOT – Kotcho
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine LS – Small Lake

Appendix VII: Prophet late winter survey, March 29, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Prophet Core Area (Westside Fort Nelson Range)
Obs Date: March 29, 2017

Obs Day: 1/1	**Time**	**Cloud Cover**	**Wind**	**Temp**	**Precip**	**Snow Depth**	**Snow Cover**
Start (March 29)	11:00	Clear	Calm	-1 C	None	51-75 cm	76-100 %
End (March 29)	12:30	Clear	Calm	+ 2 C	None	Days since 5 cm Snow: < 14 days	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Danielle Fehr Observer: William Needlay (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK045/ BC1045	PPH	VHF	No	1	8	7	0	1	0	0	10	555856	6461175	BB	
SCEK049/ BC1044	PPH	VHF	No	3	6	5	1	0	0	1	10	551164	6446118	BL	Group included SCEK217
SCEK051/ BC1060	PPH	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	572310	6442809	BL	Mortality (C1)
SCEK148	CLR to PPH	VHF	No	2	4	4	0	0	0	0	10	541545	6459964	BB	Originally collared in Clarke Core Area, Snake-Sahtaneh Range (C2)
SCEK217	PPH	GPS	No	(3)	dupl	dupl	dupl	dupl	dupl	dupl	10	551164	6446118	BL	Group included SCEK049/BC1044

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Prophet Core Area (Westside Fort Nelson Range)
Obs Date: March 29, 2017

Obs #	UTM	Prophet Core Area Additional Observations
n/a		

Comments	
C1	SCEK051/BC1060 (Lotek VHF) mortality was detected and investigated during the March 29, 2017 survey (MI-114); confirmed wolf kill
C2	SCEK148 (Lotek VHF) was collared in CLR in March 2013, moved between CLR and CNCA, then moved to PPH in fall 2016 and was located in PPH during the March 2017 survey
CX1	SCEK161B/BC1059 was collared outside PPH on 3 occasions (February 2011, April 2013, March 2015); caribou moves between PPH and CNCA; located in CNCA during March 29, 2017 survey

[1] PPH - Prophet CLR – Clarke CNCA – Chinchaga North
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine

Appendix VIII: Parker late winter survey, March 28, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Parker Core Area (Westside Fort Nelson Range)
Obs Date: March 28, 2017

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 28)	13:50	Unbroken	Light Air	-2 C	None	26-50	76-100 %
End (March 28)	15:10	Unbroken	Light Air	-2 C	None	Days since 5 cm Snow:	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needley (FNFN)

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK010/ BC1039	PRK	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	477595	6516365	BL	Mortality (C1)
SCEK012/ BC1041	PRK	VHF	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	494223	6521021	BB	Mortality (C2)
SCEK015/ BC1040	PRK	VHF	No	1	6	4	0	2	0	0	10	497099	6520097	BB	
SCEK016B	PRK	GPS	No	2	7	3	3	1	0	2	10	489909	6519949	BL	
SCEK194	PRK	GPS	Yes	3	4	2	0	2	0	0	10	491435	6523644	BB	Group included SCEK238
SCEK237	PRK	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 heard or seen; premature Vertex collar failure - not transmitting GPS data or VHF signal; (C3)

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Parker Core Area (Westside Fort Nelson Range)
Obs Date: March 28, 2017

Caribou ID	Core Area[1]	Type	Calf	Grp #	Grp Tot	Classification					Zone	East	North	BEU[2]	Comments
						F	M	Juv	Uncl	mm					
SCEK238	PRK	GPS	Yes	(3)	dupl	dupl	dupl	dupl	dupl	dupl	10	491435	6523644	BB	Premature collar failure - not transmitting GPS data or VHF signal at time of survey but located visually in group with SCEK194; (C4)
Uncoll #1	n/a	n/a	n/a	4	6	6	0	0	0	0	10	488351	6519824	BB	

Obs #	UTM	Parker Core Area Additional Observations
1	10.501046.6517426	Moose x 2 adults
2	10.499969.6528379	Moose x 3 adults
3	10.505712.6534705	Moose x 1 adult

Comments	
C1	SCEK010/BC1039 (Lotek VHF) mortality detected during survey (MI-113); no landing site therefore no ground investigation and collar not retrieved
C2	SCEK012/BC1041 (Lotek VHF) mortality detected and investigated during survey (MI-112); confirmed wolf kill
C3	SCEK237 was collared in Feb 2016; Vertex collar failed prematurely - not transmitting GPS data or VHF signal; not heard or seen during survey; last GPS data transmitted on Dec 25, 2016; VHF signal not detected on April 2017 telemetry flight
C4	SCEK238 was collared in Feb 2016; Vertex collar failed prematurely – transmitted intermittent GPS data through Feb and March 2017 (ceased transmitting GPS data on April 5, 2017); VHF beacon also failed and was not transmitting during the March 2017 survey but caribou was located visually in group with SCEK194 (ID confirmed by collar/eartag configuration); VHF signal not detected on April 2017 telemetry flight
CX1	Snowmobile tracks observed throughout search area

[1] PRK - Parker
[2] Broad Ecosystem Unit (BEU): BB - Black Spruce Bog BL - Black Spruce-Lodgepole Pine

Appendix IX: Fort Nelson late winter survey, March 28, 2017

Animal Observation Form – Boreal Caribou 2017 Late Winter Recruitment Survey

Project: OGRIS (SCEK) Boreal Caribou Survey: Late Winter Recruitment Study Area: Fort Nelson Core Area (Westside Fort Nelson Range)
Obs Date: March 28, 2017

Obs Day: 1/1	Time	Cloud Cover	Wind	Temp	Precip	Snow Depth	Snow Cover
Start (March 28)	15:22	Scattered > 50 %	Light Air	-2 C	None	26-50	76-100 %
End (March 28)	15:45	Scattered > 50 %	Light Air	-2 C	None	Days since 5 cm Snow: < 14	

Navigator/Observer: Brad Culling Recorder/Observer: Diane Culling Pilot/Observer: Daniel Fehr Observer: William Needley (FNFN)

Caribou ID	Core Area[1]	Type	Calf[2]	Grp #	Grp Tot	Classification					Zone	East	North	BEU[3]	Comments
						F	M	Juv	Uncl	mm					
SCEK009B/ BC1055	FN	GPS	No	1	4	2	2	0	0	1	10	518791	6553915	BB	Group included SCEK167
SCEK166	FN	GPS	Yes	2	6	3	1	2	0	1	10	498913	6558724	BL	
SCEK167	FN	GPS	No	(1)	dupl	dupl	dupl	dupl	dupl	dupl	dupl	10	518791	6553915	BB	Battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK009B/BC1055; (C1)

Obs #	UTM	Fort Nelson Core Area Additional Observations
n/a		

Comments	
C1	SCEK167 was collared in February 2014; battery expired - not transmitting GPS data or VHF signal but located visually in group with SCEK009B/BC1055 during March 2017 survey (ID confirmed by collar/eartag configuration); last GPS data transmitted Aug 29, 2016; VHF signal not detected on April 2017 telemetry flight

[1] FN - Fort Nelson

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