

DIVERSIFIED ENVIRONMENTAL SERVICES

BOX 6263, FORT ST. JOHN, B.C. V1J 4H7 PHONE/FAX (250) 787-9101

BC OIL AND GAS RESEARCH AND INNOVATION SOCIETY BOREAL CARIBOU TELEMETRY PROGRAM

FIXED-WING TELEMETRY MONITORING FLIGHT – July 10-11, 2016

Date: July 24, 2016

Attention: Brian Thomson
BC Oil and Gas Research and Innovation Society
Victoria, BC

Executive Summary

One hundred forty-seven boreal caribou collar frequencies and 22 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted on July 10-11, 2016. One hundred thirty-two caribou collars were heard transmitting normal VHF signals and 1 mortality signal was detected (Milligan VHF SCEK027).

The VHF beacons of the remaining 14 caribou collars were not detected. These included 1 SCEK ATS Iridium collar that has ceased Iridium data transmission and is believed to have failed (Kotcho male SCEK173), 3 VHF collars not detected by heard recently (Kiwigana SCEK064, East Kotcho SCEK105, Fortune BC1033), and 10 SCEK Vectronic GPS collars that ceased GPS data transmission prior to the July monitoring flight.

No wolf mortality indications were detected during the July flight.

Background

Between December 17, 2012 and March 31, 2016, 240 individual adult boreal caribou were radio-collared in British Columbia's boreal caribou ranges as part of the *British Columbia Boreal Caribou Implementation Plan* (BCIP). On July 10-11, 2016, Diversified Environmental Services (DES) conducted a fixed-wing telemetry monitoring flight under contract to the BC Oil and Gas Research and Innovation Society (OGRIS; formerly the *Science and Community Environmental Knowledge Fund* (SCEK)) on behalf of the Research and Effectiveness Monitoring Board (REMB). Fixed-wing monitoring flights are conducted at monthly intervals throughout the year in order to identify mortality events to be followed up by ground-based mortality investigations and collar recoveries, as well as to track potential long distance seasonal movements of VHF-collared caribou.

Objectives

The objective of the July 10-11, 2016 monitoring flight was to determine the approximate location and VHF beacon status of all boreal caribou and wolf collars believed to be active in the survey area. These included caribou and wolf collars deployed on behalf of SCEK, caribou collars deployed on behalf of MFLNRO, wolf collars deployed for a research program funded by Nexen Inc., and pre-existing collars known to have entered BC's boreal caribou ranges from adjacent jurisdictions.

Methods

The monitoring flight was conducted using a Cessna 180 fixed-wing aircraft equipped with 1 outward-facing directional antenna affixed to each wing strut. Collar frequencies were scanned using Lotek™ STR 1000 and Lotek BioTracker telemetry receivers. The flight was conducted at 700-1,200 m above ground level at an average speed of 160 km/hr. The VHF beacon status of all detected collars was recorded on hard copy forms. In the case of VHF collars (Lotek LMRT4), status was recorded as either normal (60 pulses per minute (ppm)) or mortality mode (120 ppm), and a location (+/- 1 km) was recorded using a hand-held GPS unit. As GPS/satellite collars are programmed to log multiple daily locations with high precision, additional effort to obtain collar locations after VHF signal detection is not necessary. Therefore, waypoints for GPS/satellite collars were typically recorded at the location from which the collar was heard, with corrections for estimated bearing and distance, unless the VHF beacon status indicated a collar malfunction or mortality, in which case, more precise locations were obtained.

Results

One hundred forty-seven caribou collar frequencies were scanned during the July 10-11, 2016 monitoring flight, including 144 SCEK collars (1 ATS Iridium, 73 Vectronic Vertex, 10 Lotek LifeCycle, and 60 Lotek VHF), 2 previously-deployed MFLNRO VHF collars, and 1 VHF collar of unknown origin. In addition, 22 wolf collar frequencies were scanned during the flight, including 15 SCEK wolf collars (11 Lotek Iridium, 4 Lotek VHF) and 7 University of Alberta/Nexen collars (Lotek Iridium). Several unrecovered SCEK Iridium wolf collars assumed to have exceeded their battery lives were not scanned.

Results of the July 10-11, 2016 monitoring flight are presented in Table 1. Flight paths searched within and adjacent to each core habitat area are shown in Figure 1. Total flight line distance was 2,608 km. Of 147 caribou collar frequencies scanned, 132 normal VHF signals and 1 mortality signal were detected. The VHF beacons of the remaining 14 caribou collars were not detected. These included 1 SCEK ATS Iridium collar that has ceased Iridium data transmission and is believed to have failed (Kotcho male SCEK173), 3 VHF collars not detected by heard recently (Kiwigana SCEK064, East Kotcho SCEK105, Fortune BC1033), and 10 SCEK Vectronic GPS collars that ceased GPS data transmission prior to the

July monitoring flight (SCEK034, SCEK055, SCEK071, SCEK085, SCEK119, SCEK142, SCEK169B, SCEK204, SCEK234, SCEK236).

Milligan caribou mortality SCEK027 (Lotek VHF) was detected during the July 10 flight. This animal was last heard transmitting a normal VHF signal on May 31, 2016. As of May 1, 2016, mortality indications involving VHF collars will not be investigated at the time of detection; VHF collars will be recovered from the field opportunistically in conjunction with related fieldwork.

Of the 22 wolf collar frequencies scanned during the July 2016 monitoring flight, 10 normal VHF signals and no mortality signals were detected. The remaining 12 wolf collars were not detected. These included 3 VHF collars, 4 GPS/satellite collars transmitting data indicating normal activity, and 5 GPS/satellite collars whose GPS data transmissions ceased prior to the July monitoring flight.

There were no opportunities for First Nations field assistance on this monitoring flight.

Cordially,

A handwritten signature in black ink, appearing to read 'Brad Culling', with a stylized flourish at the end.

Brad Culling, R.P.Bio
Diversified Environmental Services
Fort St. John, BC

Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the July 10-11, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK112	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	643606	6642482	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	615063	6611037	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	11-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data June 13, 16
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	597136	6626854	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	635737	6675211	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	603105	6626647	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	n/a	n/a	VHF signal heard in NWT but not located
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	643886	6647306	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	11-Jul-16	10	642244	6652267	normal
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11-Jul-16	10	614687	6609011	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11-Jul-16	10	626344	6633945	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11-Jul-16	10	610658	6637819	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11-Jul-16	10	606026	6667543	normal
SCEK181b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11-Jul-16	10	611616	6618366	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11-Jul-16	10	591342	6618328	normal
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	50 ppm	11-Jul-16	10	586629	6636447	normal
SCEK234	Caribou	Calendar	Calendar	Vectr-VertexTD	not heard	11-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Jun 26, 16
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	11-Jul-16	10	593575	6654179	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	11-Jul-16	10	613679	6636330	normal
SCEK040	Caribou	Chinchaga	Etthithun	Vectr-Vertex	42 ppm	10-Jul-16	10	645929	6403886	normal
SCEK195	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	10-Jul-16	10	646436	6408542	normal
SCEK224	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	10-Jul-16	10	639362	6415850	normal
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	670226	6292212	normal
SCEK027	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	676562	6292063	MORTALITY
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	640545	6334297	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	661600	6370700	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	627661	6343266	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Dec 7, 15
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	628278	6361492	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	612510	6369257	normal
SCEK038b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	686470	6305849	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	625582	6362595	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	625033	6344410	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	644436	6359181	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Mar 16, 16
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	628482	6330519	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	618189	6341191	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	576406	6365595	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	10-Jul-16	10	n/a	n/a	VHF signal heard but not located
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	631142	6362442	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	10-Jul-16	10	628982	6379456	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	647460	6309850	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	663600	6289610	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	640508	6329445	normal
SCEK226	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	670150	6301829	normal
SCEK227	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	10-Jul-16	10	639633	6332084	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	10-Jul-16	10	600283	6411382	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Jun 12, 16
SCEK170b	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	10-Jul-16	10	646475	6436965	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 10-11, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK172	Caribou	Chinchaga	RRA-A	Lotek-Lifecycle	50 ppm	10-Jul-16	10	596105	6435214	normal
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	10-Jul-16	10	607509	6456479	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	10-Jul-16	10	603634	6446950	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	10-Jul-16	10	615555	6427045	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	10-Jul-16	10	641016	6440598	normal
SCEK236	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data May 15, 2016
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	10-Jul-16	10	517264	6550367	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	10-Jul-16	10	519442	6544135	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	10-Jul-16	10	512053	6551977	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	10-Jul-16	10	447200	6570264	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	10-Jul-16	10	462070	6575897	normal
SCEK066b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	10-Jul-16	10	444854	6571110	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	10-Jul-16	10	454368	6584351	normal
SCEK225	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	10-Jul-16	10	474598	6630429	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Feb 27, 16
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	10-Jul-16	10	524721	6628542	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	10-Jul-16	10	528799	6630770	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	10-Jul-16	10	539929	6632414	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	10-Jul-16	10	538096	6621828	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	10-Jul-16	10	496434	6630001	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	10-Jul-16	10	483299	6627912	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	531022	6633822	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	545792	6623032	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	543333	6630604	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	536718	6632420	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	477859	6630429	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	10-Jul-16	10	543782	6628461	normal
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	10-Jul-16	10	477736	6630540	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	10-Jul-16	10	n/a	n/a	VHF signal heard but not located
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	10-Jul-16	10	546671	6563907	normal
SCEK169b	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	not heard	10-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Jun 03, 16
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	10-Jul-16	10	532378	6571633	normal
SCEK231	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	10-Jul-16	10	521668	6563480	normal
SCEK232	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	10-Jul-16	10	524772	6565389	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	10-Jul-16	10	487427	6501523	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	10-Jul-16	10	491573	6507024	normal
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	10-Jul-16	10	486437	6523308	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	10-Jul-16	10	478777	6512789	normal
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	10-Jul-16	10	484362	6522011	normal
SCEK237	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	10-Jul-16	10	449752	6544223	normal
SCEK238	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	10-Jul-16	10	475638	6515626	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	10-Jul-16	10	538020	6462674	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	10-Jul-16	10	553715	6448691	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	10-Jul-16	10	532820	6483823	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	10-Jul-16	10	594732	6438036	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	10-Jul-16	10	556184	6449634	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	571033	6505048	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 10-11, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	10-Jul-16	10	588378	6489766	normal
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	569372	6501826	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	566790	6482773	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11-Jul-16	10	565022	6527796	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	n/a	n/a	n/a	VHF signal heard but not located
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11-Jul-16	10	592654	6548404	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	587642	6452834	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	576753	6494593	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	599813	6484976	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	558278	6500682	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	543077	6499858	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	10-Jul-16	10	569694	6496704	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	10-Jul-16	10	598115	6485756	normal
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	10-Jul-16	10	604605	6485141	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	10-Jul-16	10	560090	6500724	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	11-Jul-16	10	555311	6542285	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	10-Jul-16	10	605704	6482524	normal
SCEK239	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	10-Jul-16	10	537423	6494563	normal
SCEK240	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	10-Jul-16	10	561077	6493311	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	11-Jul-16	10	633145	6561464	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	not heard	11-Jul-16	n/a	n/a	n/a	VHF signal not detected
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11-Jul-16	10	633008	6560618	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11-Jul-16	n/a	n/a	n/a	VHF signal heard but not located
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11-Jul-16	10	596083	6581266	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11-Jul-16	10	607765	6591492	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	604633	6583417	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	635819	6569568	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	84 ppm	11-Jul-16	10	606024	6583311	normal
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	602761	6583480	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	596443	6571932	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	11-Jul-16	10	611414	6554733	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	not heard	11-Jul-16	n/a	n/a	n/a	VHF signal not detected; last data Jun 26, 16
SCEK228	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	632561	6546297	normal
SCEK229	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	610883	6578872	normal
SCEK230	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11-Jul-16	10	591273	6575893	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	11-Jul-16	10	562299	6532945	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	10-Jul-16	10	529819	6599567	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	549645	6601686	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	553174	6598087	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	558971	6603805	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	557341	6593563	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	552412	6593314	normal
SCEK233	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	10-Jul-16	10	559212	6602174	normal
UNKN	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	10-Jul-16	10	561217	6601307	normal; unknown collared caribou
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected; no data since June 27, 15
SCEK091	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	11-Jul-16	10	616147	6582592	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected; no data since July 28, 15
SCEK209	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	10-Jul-16	10	524402	6570503	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	10-Jul-16	10	556935	6609570	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 10-11, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
BW034	Wolf	Calendar	July	Lotek VHF	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected
BW042nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	11-Jul-16	10	624491	6637464	VHF normal; GPS data normal
BW043nex	Wolf	Calendar	July	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; last data June 14, 16
BW044nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	11-Jul-16	10	629868	6628861	VHF normal; last data Apr 10, 16
BW045nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	11-Jul-16	10	624491	6637464	VHF normal; GPS data normal
BW046nex	Wolf	Calendar	July	Lotek Iridium	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected; GPS data ceased Dec 21, 15
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	10-Jul-16	10	606434	6355114	normal
BW053	Wolf	Chinchaga	Kahntah	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; GPS data normal
BW038	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	10-Jul-16	10	578541	6489779	VHF normal; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	10-Jul-16	10	539646	6494779	VHF normal; GPS data normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	10-Jul-16	10	539646	6494779	VHF normal; GPS data normal
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; last data Oct 14, 15
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	10-Jul-16	10	561213	6600916	VHF normal; last data Nov 23, 15
BW047nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	10-Jul-16	10	561213	6600916	VHF normal; last data Oct 30, 15
BW049nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; GPS data normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	10-Jul-16	10	561324	6598595	VHF normal; last data Nov 06, 15
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; Last GPS data Nov 22, 15
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	10-Jul-16	n/a	n/a	n/a	VHF not detected; last GPS data Jan 20, 16
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected; GPS data normal
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected
BW052	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	11-Jul-16	n/a	n/a	n/a	VHF not detected; GPS data normal

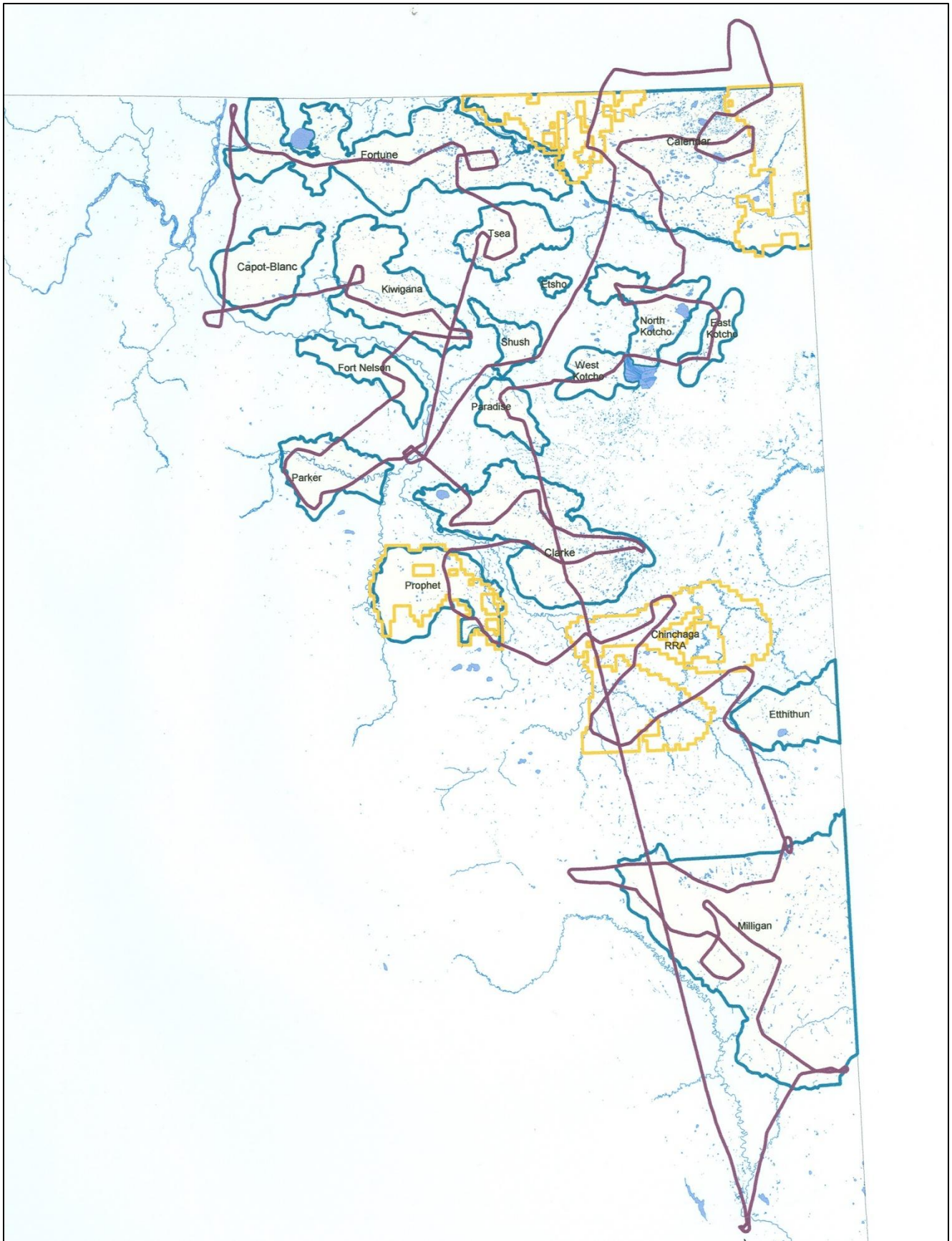


Figure 1. Flight paths flown during the July 10-11, 2016 OGRIS boreal caribou and wolf fixed-wing telemetry monitoring flight.