

DIVERSIFIED ENVIRONMENTAL SERVICES

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

FIXED-WING TELEMETRY MONITORING FLIGHT – April 24-25, 2017

Date: April 30, 2017

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

Executive Summary

One hundred twenty-seven boreal caribou collar frequencies and 15 wolf collar frequencies were scanned during a fixed-wing telemetry monitoring flight conducted on April 24-25, 2017. Eleven unrecovered caribou collars not detected in the past 6 months and assumed to have exceeded their battery lives were not scanned.

Of the 127 caribou collars scanned, 105 were heard transmitting normal VHF signals, one was transmitting a double-pulse low-battery signal, and one was transmitting a mortality signal (SCEK045). The remaining 20 collars were not detected, including 18 that are assumed to have exceeded their battery lives. One wolf collar mortality signal was also detected (BW045nex).

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 April 24-25, 2017, 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 regular intervals throughout the year to track the seasonal timing of caribou mortality events in order to estimate annual adult female survival rate and population trend, as well as identify mortality signals to be potentially followed up by ground-based mortality investigations and collar recoveries (GPS collars only).

Objectives

The objective of the April 24-25, 2017 monitoring flight was to determine the approximate location and VHF beacon status of all boreal caribou and wolf radio-collars believed to be active in BC's boreal caribou ranges. These included caribou and wolf collars deployed on behalf of OGRIS (*hereafter*, SCEK collars), caribou collars deployed on behalf of the Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO), and wolf collars deployed for a University of Alberta research program funded by Nexen Inc.

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 1,000-1,500 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

During the April 2017 monitoring flight, 127 caribou collar frequencies were scanned, including 124 SCEK collars (71 Vectronic Vertex and 53 Lotek VHF), and 3 previously-deployed MFLNRO VHF collars. Eleven unrecovered collars assumed to have exceeded their battery lives were not scanned during April. These included 10 SCEK Lotek Lifecycle GPS collars (SCEK167, SCEK172, SCEK175, SCEK176, SCEK185, SCEK187, SCEK191, SCEK192, SCEK197, SCEK204) and one ATS Iridium GPS collar (SCEK173), which have not transmitted data or been detected within the past 6 months.

In addition, 15 wolf collar frequencies were scanned during the flight, including 11 SCEK wolf collars (7 Lotek Iridium, 4 Lotek VHF) and 4 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 April 24-25, 2017 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 2,298 km. Of

127 caribou collar frequencies scanned, 105 normal VHF signals, one double-pulse low-battery signal (SCEK170b) and one mortality signal (SCEK045 Prophet VHF) were detected. The VHF beacons of the remaining 20 caribou collars were not detected. Eighteen of these are assumed to have exceeded their battery lives, including 16 SCEK Vectronic Vertex GPS collars which have not transmitted data or been detected in the several months and 2 MFLNRO VHF collars whose VHF signals have not been detected in the past 6 months (BC1014, BC1033). Scanning of these 18 collars will be discontinued on subsequent monitoring flights. .

Of the 15 wolf collar frequencies scanned during the April 2017 flight, 2 normal VHF signals, one low-battery VHF signal (BW044nex), and one mortality signal (BW045nex) were detected. Transmitted GPS data indicates that collar BW045nex ceased movement on April 18, 2017. The remaining 11 wolf collars were not detected. These include 8 GPS/satellite collars whose GPS data transmissions ceased prior to the April monitoring flight and 3 VHF collars whose VHF signal have not been recently detected.

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 April 24-25, 2017 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	4/25/2017	10	617552	6608053	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	610185	6627311	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	4/25/2017	n/a	n/a	n/a	VHF signal not detected; last data Jun 13, 16
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	598971	6633657	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	635775	6654724	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	598004	6623759	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	648802	6675835	normal; in NWT
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	646863	6633216	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	4/25/2017	n/a	n/a	n/a	VHF signal not detected; last data Aug 12, 16
SCEK136b	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/25/2017	10	614598	6605250	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/25/2017	10	624717	6636855	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/25/2017	10	608703	6638083	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/25/2017	10	623752	6635188	normal
SCEK181b	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/25/2017	10	641951	6644210	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/25/2017	10	583340	6622010	normal
SCEK234	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	4/25/2017	n/a	n/a	n/a	VHF signal not detected; last data Jun 26, 16
SCEK126b	Caribou	Calendar	RRA-C	Vectr-Vertex	42 ppm	4/25/2017	10	612508	6646886	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	4/25/2017	10	617660	6630981	normal
SCEK040	Caribou	Chinchaga	Ethithun	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Jun 22, 16
SCEK195	Caribou	Chinchaga	Ethithun	Vectr-Vertex	42 ppm	4/24/2017	10	645915	6407327	normal
SCEK224	Caribou	Chinchaga	Ethithun	Vectr-Vertex	42 ppm	4/24/2017	10	638598	6418168	normal
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/25/2017	10	671506	6299382	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	643843	6337783	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	n/a	n/a	VHF heard not located
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	662766	6337521	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Dec 7, 15
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	627436	6353382	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	610894	6363696	normal
SCEK038b	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	4/24/2017	10	n/a	n/a	VHF signal not detected; last data Oct 19, 16
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	635579	6382327	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	650032	6344504	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Mar 16, 16
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	627625	6379654	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	626466	6347578	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	613350	6360523	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/24/2017	10	659796	6338149	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	626631	6376241	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	646677	6305165	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	659529	6291438	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	635921	6343581	normal
SCEK226	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	4/24/2017	10	658472	6299166	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	4/24/2017	10	597658	6428999	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Jun 12, 16
SCEK170b	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm double	4/24/2017	10	640489	6449080	double pulse
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/24/2017	10	610131	6450622	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/24/2017	10	606733	6443837	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/24/2017	10	613656	6449805	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/24/2017	10	642552	6445935	normal
SCEK236	Caribou	Chinchaga	RRA-A	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data May 15, 16

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the April 24-25, 2017 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-Vertex	42 ppm	4/24/2017	10	518837	6553366	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-Vertex	42 ppm	4/24/2017	10	518248	6549616	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-Vertex	42 ppm	4/24/2017	10	466630	6572489	normal
SCEK066b	Caribou	Maxhamish	Capot-Blanc	Vectr-Vertex	42 ppm	4/24/2017	10	471624	6580539	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	4/24/2017	10	472145	6578187	normal
SCEK225	Caribou	Maxhamish	Capot-Blanc	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Feb 27, 17
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Feb 27, 16
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/24/2017	10	523015	6634299	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/24/2017	10	543573	6630013	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/24/2017	10	539445	6622534	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	527438	6633229	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	548736	6614776	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	542866	6627658	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	541919	6623218	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	484735	6627042	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	4/24/2017	10	542584	6627177	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	4/24/2017	10	528169	6568294	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	4/24/2017	10	523403	6566467	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	42 ppm	4/24/2017	10	550814	6560429	normal
SCEK169b	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Jun 03, 16
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	42 ppm	4/24/2017	10	525139	6566222	normal
SCEK231	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	42 ppm	4/24/2017	10	523966	6570653	normal
SCEK232	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	42 ppm	4/24/2017	10	525620	6508648	normal VHF; GPS data sporadic
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	4/24/2017	10	490297	6520120	normal
SCEK016b	Caribou	Parker	Parker	Vectr-Vertex	42 ppm	4/24/2017	10	483827	6517316	normal
SCEK194	Caribou	Parker	Parker	Vectr-Vertex	42 ppm	4/24/2017	10	482533	6515735	normal
SCEK237	Caribou	Parker	Parker	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Dec 25, 16
SCEK238	Caribou	Parker	Parker	Vectr-Vertex	not heard	4/24/2017	n/a	n/a	n/a	VHF signal not detected; last data Apr 05, 17
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	120 ppm	4/24/2017	10	569545	6448529	MORTALITY
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	4/24/2017	10	554996	6445832	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-Vertex	42 ppm	4/24/2017	10	616702	6448714	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-Vertex	42 ppm	4/24/2017	10	570870	6448424	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	572413	6505010	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	589673	6489346	normal
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	573580	6501834	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	551514	6492124	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	n/a	n/a	VHF heard not located
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	573848	6500891	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/25/2017	10	615224	6559293	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	573679	6446745	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	571417	6497353	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	607049	6484506	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	564055	6499496	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	545105	6495194	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/24/2017	10	563731	6473800	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	567467	6502404	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the April 24-25, 2017 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	570629	6505057	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	609375	6483632	normal
SCEK239	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	532894	6506049	normal
SCEK240	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	4/24/2017	10	565115	6493607	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	4/25/2017	10	638819	6565142	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	4/25/2017	10	640330	6573299	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/25/2017	10	620041	6560770	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/25/2017	10	606889	6594090	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/25/2017	10	607269	6578994	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/25/2017	10	614033	6565986	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	4/25/2017	10	624262	6581519	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	4/25/2017	10	622546	6562128	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	not heard	4/25/2017	n/a	n/a	n/a	VHF signal not detected; last data Jul 10, 16
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	4/25/2017	10	603171	6565140	normal
SCEK228	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	not heard	4/25/2017	n/a	n/a	n/a	VHF signal not detected; last data Jul 09, 16
SCEK229	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	4/25/2017	10	616112	6568734	normal
SCEK230	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	4/25/2017	10	584361	6591303	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	4/24/2017	10	574893	6483135	normal
BC1028	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/24/2017	10	559037	6602027	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-Vertex	42 ppm	4/24/2017	10	560334	6594601	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/24/2017	10	561896	6604965	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/24/2017	10	560443	6607030	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/24/2017	10	562041	6600794	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/25/2017	10	578958	6594591	normal
SCEK233	Caribou	Snake-Sahtaneh	Tsea	Vectr-Vertex	42 ppm	4/24/2017	10	564101	6598586	normal
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	not heard	4/25/2017	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	4/25/2017	10	603694	6581289	normal
SCEK209	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	4/24/2017	10	515888	6572578	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	4/24/2017	10	543071	6614993	normal
BW034	Wolf	Calendar	July	Lotek VHF	not heard	4/25/2017	n/a	n/a	n/a	VHF not detected
BW043nex	Wolf	Calendar	July	Lotek Iridium	not heard	4/25/2017	n/a	n/a	n/a	VHF not detected; last data June 14, 16
BW044nex	Wolf	Calendar	July	Lotek Iridium	50 ppm double	4/25/2017	10	612331	6633475	VHF low battery; last data Apr 10, 16
BW045nex	Wolf	Calendar	July	Lotek Iridium	100 ppm	4/25/2017	10	605702	6582928	MORTALITY; Stopped moving April 18, 17
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	4/24/2017	10	638275	6342714	normal
BW053	Wolf	Chinchaga	Kahntah	Lotek Iridium	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected; no data since May 14, 17
BW038	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	4/24/2017	10	564834	6500147	VHF normal; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected; last GPS data Sep 29, 16
BW040	Wolf	Clarke	Elleh	Lotek Iridium	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected; last GPS data Feb 13, 17
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected
BW049nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected; last data Dec 22, 16
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	4/24/2017	n/a	n/a	n/a	VHF not detected; last GPS data Jan 20, 16
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	50 ppm	4/25/2017	n/a	n/a	n/a	VHF heard not located; last data Nov 17, 16
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	4/25/2017	n/a	n/a	n/a	VHF not detected
BW052	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	4/25/2017	n/a	n/a	n/a	VHF not detected; last data Nov 24, 16

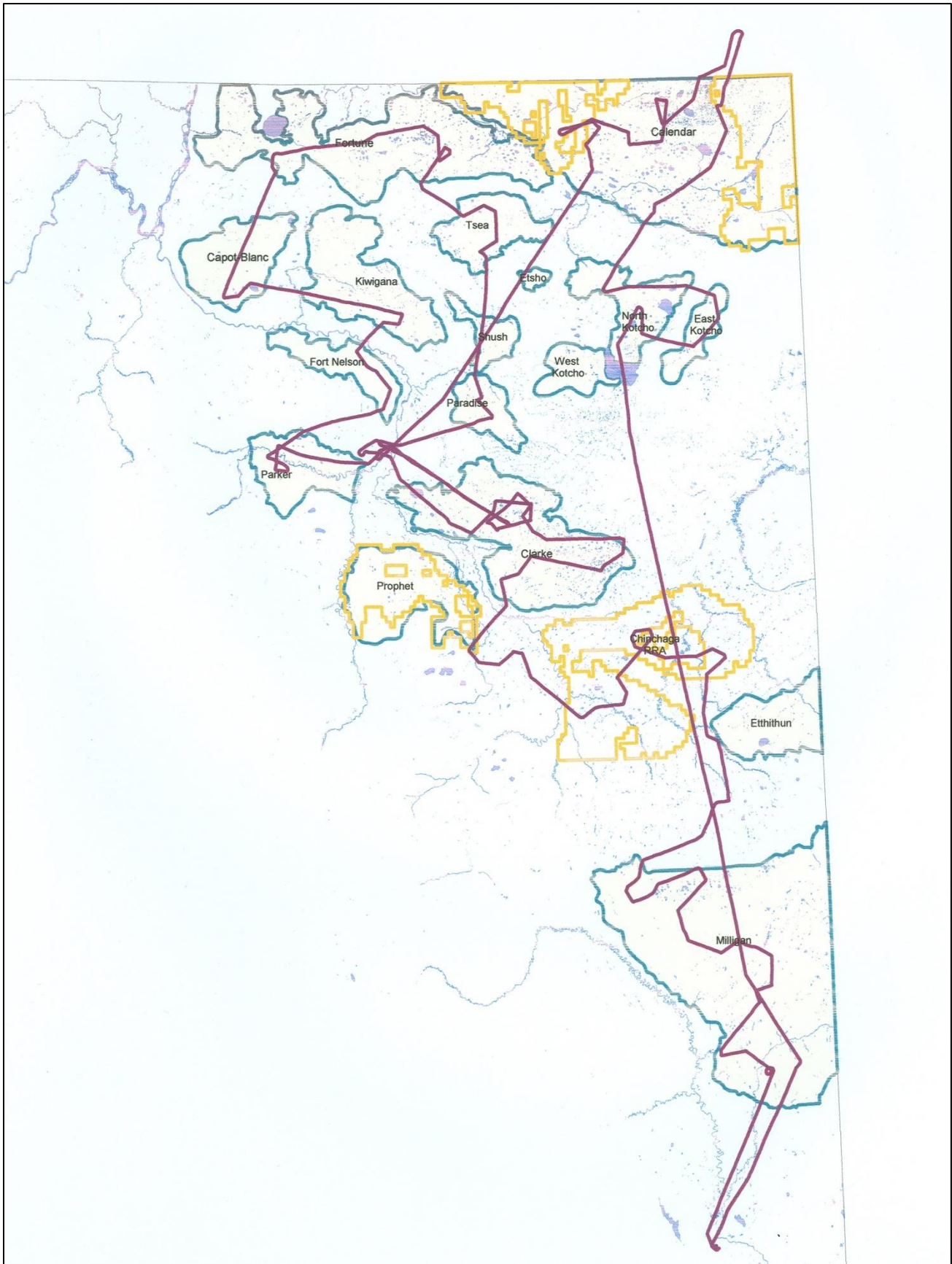


Figure 1. Flight paths flown during the April 24-25, 2017 OGRIS boreal caribou and wolf fixed-wing telemetry monitoring flight.