

DIVERSIFIED ENVIRONMENTAL SERVICES

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

FIXED-WING TELEMETRY MONITORING FLIGHT – September 6-7, 2016

Date: September 24, 2016

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

Executive Summary

One hundred forty-six boreal caribou collar frequencies and 22 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted on Sep 6-7, 2016. One hundred twenty-seven caribou collars were heard transmitting normal VHF signals; no mortality signals were detected.

The VHF beacons of the remaining 19 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), 1 MFLNRO VHF collar not detected but heard recently (Fortune BC1033), and 17 SCEK GPS collars (4 Lotek LifeCycle and 13 Vectronic Vertex) that ceased GPS data transmission prior to the September monitoring flight and may be nearing the end of their battery life.

One wolf mortality signal associated with a University of Alberta research project was detected during the September flight (BW042nex).

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 Sep 6-7, 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 regular 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 Sep 6-7, 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

The monitoring flight preceding the Sep 6-7 flight was conducted on July 10-11, 2016; no flights were conducted in August due to unsuitable weather during the latter part of the month. One hundred forty-six caribou collar frequencies were scanned during the September 2016 monitoring flight, including 143 SCEK collars (1 ATS Iridium, 73 Vectronic Vertex, 10 Lotek LifeCycle, and 59 Lotek VHF), and 3 previously-deployed MFLNRO VHF collars (one active Tsea VHF collar coincidentally encountered during the past year was recently identified as previously deployed MFLNRO collar BC1028). 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 Sep 6-7, 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 2,390 km. Of 146 caribou collar frequencies scanned, 127 normal VHF signals and no mortality signals were detected. The VHF beacons of the remaining 19 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), 1 MFLNRO VHF collar not detected but heard recently (Fortune BC1033), and 17 SCEK GPS collars (4 Lotek LifeCycle and 13 Vectronic Vertex) that ceased GPS data transmission prior to the September monitoring flight and may be nearing the end of their battery life. (SCEK034, SCEK040, SCEK055, SCEK071, SCEK085, SCEK111, SCEK119, SCEK135, SCEK142, SCEK169B, SCEK172, SCEK176, SCEK185, SCEK204, SCEK228, SCEK234, SCEK236).

Of the 22 wolf collar frequencies scanned during the September 2016 monitoring flight, 6 normal VHF signals and one mortality signal were detected. The remaining 15 wolf collars were not detected. These included 3 VHF collars, 5 GPS/satellite collars transmitting data indicating normal activity, and 7 GPS/satellite collars whose GPS data transmissions ceased prior to the September monitoring flight.

The mortality signal was being transmitted by a wolf collar associated with a University or Alberta prroject funded by Nexen inc. (Calendar wolf BW042nex). GPS data indicates the animal died on Sept 1, 2016.

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

Cordially,



Brad Culling, R.P.Bio
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Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the Sep 6-7, 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	7/9/2016	10	635912	6646892	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	617241	6610941	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 13, 16
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	597511	6640184	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	627488	6667785	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	601148	6624601	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	640902	6694877	normal
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	623347	6637547	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Aug 12, 16
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/9/2016	10	622201	6617918	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/9/2016	10	634778	6642009	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/9/2016	10	614416	6642269	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/9/2016	10	607563	6665359	normal
SCEK181b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/9/2016	10	626717	6619003	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/9/2016	10	598622	6621135	normal
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 20, 16
SCEK234	Caribou	Calendar	Calendar	Vectr-VertexTD	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 26, 16
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	7/9/2016	10	596747	6654061	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	7/9/2016	10	613507	6640619	normal
SCEK040	Caribou	Chinchaga	Etthithun	Vectr-Vertex	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 22, 16
SCEK195	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	6/9/2016	10	654558	6410208	normal
SCEK224	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	6/9/2016	10	649071	6407066	normal
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	660376	6298860	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	640788	6337615	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	656023	6366181	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	638203	6326475	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Dec 7, 15
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	646854	6350191	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	620886	6346002	normal
SCEK038b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	661862	6299099	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	643983	6351033	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	640186	6328531	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	645790	6352132	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Mar 16, 16
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	644359	6328690	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	n/a	n/a	normal; VHF signal heard but not located
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	574921	6365085	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	6/9/2016	10	654481	6344334	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	628784	6366983	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	6/9/2016	10	625866	6393875	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	652917	6311522	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	662694	6288931	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	641857	6330548	normal
SCEK226	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	666638	6297911	normal
SCEK227	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	6/9/2016	10	635230	6329808	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	6/9/2016	10	595867	6422329	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 12, 16
SCEK170b	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	6/9/2016	10	641271	6439488	normal
SCEK172	Caribou	Chinchaga	RRA-A	Lotek-Lifecycle	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jul 20, 16

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the Sep 6-7, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	6/9/2016	10	598446	6454683	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	6/9/2016	10	603207	6445821	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	6/9/2016	10	601762	6445644	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	6/9/2016	10	640677	6441870	normal
SCEK236	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data May 15, 16
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	6/9/2016	10	517333	6553036	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	6/9/2016	10	522394	6542326	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	6/9/2016	10	520377	6540996	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	6/9/2016	10	472604	6578518	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	6/9/2016	10	454640	6580837	normal
SCEK066b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	6/9/2016	10	444617	6578629	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	6/9/2016	10	456677	6575427	normal
SCEK225	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	6/9/2016	10	482209	6629339	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Feb 27, 16
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	6/9/2016	10	527949	6630686	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	6/9/2016	10	519691	6632662	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	6/9/2016	10	543946	6629508	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	6/9/2016	10	535735	6623506	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	6/9/2016	10	531053	6627124	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Aug 08, 16
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	524938	6633993	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	537731	6624585	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	544246	6630847	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	538420	6625744	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	482907	6627162	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	6/9/2016	10	540557	6626924	normal
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	6/9/2016	10	468760	6644137	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	6/9/2016	10	528669	6568551	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	6/9/2016	10	530338	6567686	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	6/9/2016	10	550575	6567226	normal
SCEK169b	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	not heard	6/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 03, 16
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	6/9/2016	10	518977	6565527	normal
SCEK231	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	6/9/2016	10	524782	6568875	normal
SCEK232	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	6/9/2016	10	524198	6569315	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	6/9/2016	10	487728	6498752	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	6/9/2016	10	491585	6508778	normal
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	6/9/2016	10	490580	6522151	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	6/9/2016	10	478242	6518796	normal
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	6/9/2016	10	488092	6520928	normal
SCEK237	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	6/9/2016	10	469573	6524037	normal
SCEK238	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	6/9/2016	10	480986	6513732	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	6/9/2016	10	545671	6453919	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	6/9/2016	10	545966	6453805	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	6/9/2016	10	529687	6480265	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	6/9/2016	10	590432	6439309	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	6/9/2016	10	556570	6449487	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	571702	6503758	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	6/9/2016	10	593100	6489076	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the Sep 6-7, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	570598	6504300	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	562585	6482892	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/9/2016	10	560031	6536687	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	560939	6499444	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/9/2016	10	594050	6545354	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	577195	6452122	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	574568	6501675	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	601054	6484599	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	562280	6498324	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	544410	6496590	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	6/9/2016	10	562083	6496540	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	6/9/2016	10	597782	6488498	normal
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	6/9/2016	10	603905	6484405	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	6/9/2016	10	566191	6503815	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/9/2016	10	553687	6535077	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	6/9/2016	10	605730	6484455	normal
SCEK239	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	6/9/2016	10	545459	6490322	normal
SCEK240	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	6/9/2016	10	568028	6503386	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	7/9/2016	10	636006	6564277	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	7/9/2016	10	637807	6574783	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/9/2016	10	628519	6555457	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/9/2016	10	617313	6581157	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/9/2016	10	597892	6586486	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/9/2016	10	619088	6585334	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	622577	6576965	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	629137	6557246	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jul 10, 16
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	599879	6586139	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	606714	6567074	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	7/9/2016	10	608583	6567751	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jun 26, 16
SCEK228	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	not heard	7/9/2016	n/a	n/a	n/a	VHF signal not detected; last data Jul 09, 16
SCEK229	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	609021	6576875	normal
SCEK230	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/9/2016	10	599161	6584964	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	7/9/2016	10	558090	6537547	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	6/9/2016	10	529990	6600047	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	552618	6605984	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	555291	6593050	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	556705	6584786	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	555652	6596773	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	554461	6597356	normal
SCEK233	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	6/9/2016	10	557746	6593286	normal
BC1028	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	6/9/2016	10	556860	6603357	normal
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	not heard	7/9/2016	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	7/9/2016	10	613109	6598106	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	not heard	7/9/2016	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	6/9/2016	10	521210	6569631	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	6/9/2016	10	556658	6606650	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the Sep 6-7, 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	7/9/2016	n/a	n/a	n/a	VHF not detected
BW042nex	Wolf	Calendar	July	Lotek Iridium	80 ppm	7/9/2016	10	591949	6618979	MORTALITY
BW043nex	Wolf	Calendar	July	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; last data June 14, 16
BW044nex	Wolf	Calendar	July	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; last data Apr 10, 16
BW045nex	Wolf	Calendar	July	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW046nex	Wolf	Calendar	July	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; GPS data ceased Dec 21, 15
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	6/9/2016	10	620191	6364128	normal
BW053	Wolf	Chinchaga	Kahntah	Lotek Iridium	not heard	6/9/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW038	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	6/9/2016	10	573543	6500546	VHF normal; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	not heard	6/9/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	6/9/2016	10	579697	6493742	VHF normal; GPS data normal
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	6/9/2016	n/a	n/a	n/a	VHF not detected; battery assumed expired
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; last data Nov 23, 15
BW047nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	7/9/2016	10	579128	6605820	VHF normal; last data Oct 30, 15
BW049nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	7/9/2016	10	579128	6605820	VHF normal; last data Nov 06, 15
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	6/9/2016	n/a	n/a	n/a	VHF not detected; Last GPS data Nov 22, 15
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	6/9/2016	n/a	n/a	n/a	VHF not detected; last GPS data Jan 20, 16
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	7/9/2016	n/a	n/a	n/a	VHF not detected
BW052	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	50 ppm	7/9/2016	10	638446	6574414	VHF normal; GPS data normal

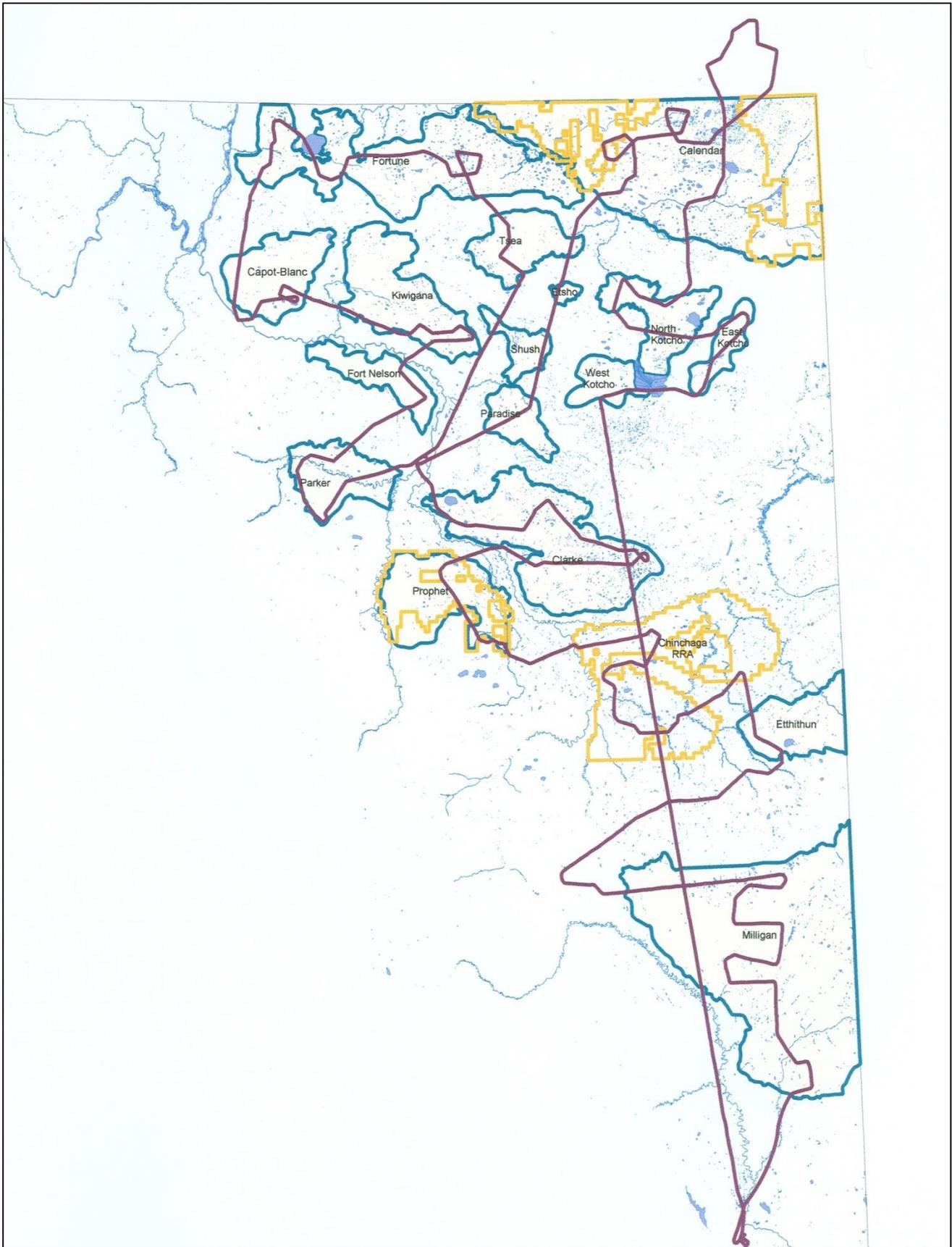


Figure 1. Flight paths flown during the September 6-7, 2016 OGRIS boreal caribou and wolf fixed-wing telemetry monitoring flight.