

# 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 16-17, 2016

**Date:** April 30, 2016

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

#### *Executive Summary*

One hundred fifty-four boreal caribou collar frequencies and 23 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted on April 16-17, 2016. One hundred forty-five caribou collars were heard transmitting normal VHF signals and 4 mortalities were detected. The VHF beacons of the remaining 5 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 SCEK Vectronic GPS collar whose VHF beacon appears to be non-functional but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), and 3 SCEK Vectronic GPS collars whose GPS data transmissions have ceased (Milligan SCEK034, SCEK055, Fortune SCEK085).

Fortune caribou mortality SCEK005B (Vectronic Vertex) was detected through GPS data transmission on April 11 and confirmed during the April 16 flight. Caribou mortalities SCEK067 (Fortune VHF), SCEK102 (East Kotcho VHF), and SCEK153 (Clarke VHF) were detected during the April 16-17 flight.

One wolf mortality (Fortune VHF BW037) was detected during the April telemetry 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 April 16-17, 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 April 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 fifty-four caribou collar frequencies were scanned during the April 16-17, 2016 monitoring flight, including 151 SCEK collars (1 ATS Iridium, 76 Vectronic Vertex, 10 Lotek LifeCycle, and 64 Lotek VHF), 2 previously-deployed MFLNRO VHF collars, and 1 VHF collar of unknown origin. In addition, 23 wolf collar frequencies were scanned during the April flight, including 16 SCEK wolf collars (11 Lotek Iridium, 5 Lotek VHF) and 7 University of Alberta/Nexen collars (Lotek Iridium). Several SCEK Iridium wolf collars assumed to have exceeded their battery lives but not recovered, were not scanned.

Results of the April 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 2,307 km. Of 154

caribou collar frequencies scanned, 145 normal VHF signals and 4 mortality signals were detected. The VHF beacons of the remaining 5 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 SCEK Vectronic GPS collar whose VHF beacon appears to be non-functional but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), and 3 SCEK Vectronic GPS collars whose GPS data transmissions have ceased (Milligan SCEK034, SCEK055, Fortune SCEK085).

Fortune caribou mortality SCEK005B (Vectronic Vertex) was detected through GPS data transmission on April 11 and confirmed to be transmitting in mortality mode during the April 16 monitoring flight. Caribou mortalities SCEK067 (Fortune VHF), SCEK102 (East Kotcho VHF), and SCEK153 (Clarke VHF) were detected during the monitoring flight.

Of the 23 wolf collar frequencies scanned during the April 2016 monitoring flight, 10 normal VHF signals and one mortality signal were detected (Fortune VHF BW037). The remaining 12 wolf collars were not detected. These included 2 VHF collars, 3 GPS/satellite collars transmitting data indicating normal activity, and 7 GPS/satellite collars whose GPS data transmission functions appear to have failed.

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 16-17, 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	4/17/2016	10	615139	6662765	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	660288	6650569	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/17/2016	10	607527	6639717	normal
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	610731	6609241	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	597393	6612152	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	612282	6581921	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	648033	6671384	normal
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	610495	6579058	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	4/17/2016	10	638557	6662980	normal
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	609071	6584129	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	4/17/2016	10	632119	6663800	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	613525	6582387	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	628063	6604001	normal
SCEK181b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	604196	6585015	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	613054	6579588	normal
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	50 ppm	4/17/2016	10	630956	6626874	normal
SCEK234	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	4/17/2016	10	612146	6611289	normal
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	4/17/2016	10	597229	6614639	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	4/17/2016	10	611135	6557672	normal
SCEK108	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	4/17/2016	10	661458	6653150	normal
SCEK040	Caribou	Chinchaga	Ethhithun	Vectr-Vertex	42 ppm	4/16/2016	10	646627	6407771	normal
SCEK195	Caribou	Chinchaga	Ethhithun	Vectr-VertexTD	42 ppm	4/16/2016	10	649000	6408585	normal
SCEK224	Caribou	Chinchaga	Ethhithun	Vectr-VertexTD	42 ppm	4/16/2016	10	652241	6419531	normal
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	669341	6299854	normal
SCEK027	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	668689	6296628	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	641752	6333134	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	657097	6369899	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	639776	6316296	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	4/16/2016	n/a	n/a	n/a	VHF signal not detected; last data Dec 7, 15
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	619548	6346458	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	614458	6363138	normal
SCEK038b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	678812	6303533	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	634296	6344665	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	623906	6348428	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	649521	6357289	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	4/16/2016	n/a	n/a	n/a	VHF signal not detected; last data Mar 16, 16
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	640955	6318375	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	622908	6340157	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	601328	6366211	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	4/16/2016	10	654814	6340969	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	635737	6364963	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	4/16/2016	10	649544	6365608	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	647027	6309663	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	664379	6289026	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	636113	6347490	normal
SCEK226	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	670692	6298680	normal
SCEK227	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	4/16/2016	10	636946	6347568	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	4/17/2016	10	614384	6401854	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/16/2016	10	602355	6455488	normal
SCEK170b	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	4/16/2016	10	629516	6440050	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the April 16-17, 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	4/16/2016	10	597143	6445485	normal
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	619583	6440025	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	594355	6457488	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	617009	6441798	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	641590	6442043	normal
SCEK216	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	4/16/2016	10	615188	6444184	VHF not heard since Apr 2015; GPS activity normal
SCEK235	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	620637	6460069	normal
SCEK236	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	4/16/2016	10	602632	6452899	normal
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	4/16/2016	10	517504	6553451	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	4/16/2016	10	514600	6549768	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	4/16/2016	10	519824	6550133	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	4/16/2016	10	467724	6579748	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	4/16/2016	10	466373	6574085	normal
SCEK066b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	4/16/2016	10	466775	6574127	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	4/16/2016	10	466006	6574057	normal
SCEK225	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	4/16/2016	10	467940	6563192	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/16/2016	10	528315	6625064	normal
SCEK005b	Caribou	Maxhamish	Fortune	Vectr-VertexTD	84 ppm	4/16/2016	10	493567	6614677	MORTALITY
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	4/16/2016	n/a	n/a	n/a	VHF signal not detected; last data Feb 27, 16
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/16/2016	10	555976	6595109	normal
SCEK087	Caribou	Maxhamish	Fortune	Lotek VHF	120 ppm	4/16/2016	10	526855	6629427	MORTALITY
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/16/2016	10	520899	6632309	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/16/2016	10	540341	6630432	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	4/16/2016	10	535968	6624345	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	4/16/2016	10	529571	6626563	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	4/16/2016	10	484252	6628227	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	529185	6633388	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	524051	6636601	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	543715	6621929	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	530144	6624296	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	484484	6627681	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	4/16/2016	10	543864	6628505	normal
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	4/16/2016	10	467806	6646821	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	4/16/2016	10	527676	6568654	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	4/16/2016	10	553497	6591714	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	4/16/2016	10	536875	6564642	normal
SCEK169b	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	4/16/2016	10	521217	6569670	normal
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	4/16/2016	10	537195	6563309	normal
SCEK231	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	4/16/2016	10	521851	6569564	normal
SCEK232	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	4/16/2016	10	526831	6568787	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	4/16/2016	10	498535	6510685	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	4/16/2016	10	503032	6519004	normal
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	4/16/2016	10	492551	6519802	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	4/16/2016	10	480944	6516657	normal
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	4/16/2016	10	488328	6521300	normal
SCEK237	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	4/16/2016	10	491967	6521568	normal
SCEK238	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	4/16/2016	10	482457	6518845	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	4/16/2016	10	546498	6462475	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	4/16/2016	10	557576	6448992	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	4/16/2016	10	553261	6460866	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the April 16-17, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	4/16/2016	10	582010	6439861	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	4/16/2016	10	578380	6439374	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	570628	6506160	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	565478	6506976	normal
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	563794	6505607	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	552686	6492995	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	570054	6502484	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	568771	6500649	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/17/2016	10	563723	6510216	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	602453	6485122	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	573152	6499728	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	606334	6483787	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	562278	6499950	normal
SCEK153	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	120 ppm	4/16/2016	10	522268	6507346	MORTALITY
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	543655	6497207	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	4/16/2016	10	562835	6494670	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	4/16/2016	10	600068	6486778	normal
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	4/16/2016	10	607203	6484587	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	552176	6505182	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	558902	6505109	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	608498	6484388	normal
SCEK239	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	536550	6497747	normal
SCEK240	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	4/16/2016	10	549284	6491425	normal
SCEK102	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	120 ppm	4/17/2016	10	556889	6512450	MORTALITY
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	4/17/2016	10	630403	6560619	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	4/17/2016	10	634049	6553816	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/17/2016	10	633738	6559672	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/17/2016	10	597238	6579287	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/17/2016	10	601079	6582741	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	4/17/2016	10	609917	6556086	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	609364	6600030	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	623656	6555829	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	84 ppm	4/17/2016	10	548816	6550217	normal
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	613598	6558124	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	611987	6570944	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	4/17/2016	10	581090	6519547	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	4/17/2016	10	613987	6568944	normal
SCEK228	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	633678	6552596	normal
SCEK229	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	617106	6569221	normal
SCEK230	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	4/17/2016	10	594591	6577880	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	4/16/2016	10	569103	6504937	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	4/16/2016	10	554808	6589689	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	559191	6602222	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	554038	6593503	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	561756	6601708	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	556171	6592361	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	557516	6597259	normal
SCEK233	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	4/16/2016	10	555357	6590094	normal
UNKN	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	4/16/2016	10	555871	6597077	normal; unknown collared caribou
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	4/17/2016	10	589474	6548001	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the April 16-17, 2016 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK091	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	4/17/2016	10	608279	6572067	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	not heard	4/17/2016	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	4/17/2016	10	596453	6552006	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	4/16/2016	10	534312	6562761	normal
BW034	Wolf	Calendar	July	Lotek VHF	60 ppm	4/17/2016	10	596898	6608761	normal
BW042nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	4/17/2016	10	626010	6621862	VHF normal; GPS data normal
BW043nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	4/17/2016	10	626010	6621862	VHF normal; GPS data normal
BW044nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	4/17/2016	10	606343	6626628	VHF normal; last data Apr 10, 16
BW045nex	Wolf	Calendar	July	Lotek Iridium	50 ppm	4/17/2016	10	626010	6621862	VHF normal; GPS data normal
BW046nex	Wolf	Calendar	July	Lotek Iridium	not heard	4/17/2016	n/a	n/a	n/a	VHF not detected; GPS data ceased Dec 21, 15
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	4/16/2016	10	620658	6348869	normal
BW053	Wolf	Chinchaga	Kahntah	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW038	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	4/16/2016	10	580318	6490742	VHF normal; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	4/16/2016	10	580318	6490742	VHF normal; GPS data normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	4/16/2016	10	580318	6490742	VHF normal; GPS data normal
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; last data Oct 14, 15
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; last data Nov 23, 15
BW047nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; last data Oct 30, 15
BW049nex	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	4/16/2016	10	602575	6602747	VHF normal; GPS data normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; last data Nov 06, 15
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; Last GPS data Nov 22, 15
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	4/16/2016	n/a	n/a	n/a	VHF not detected; last GPS data Jan 20, 16
BW037	Wolf	Maxhamish	Fortune	Lotek VHF	120 ppm	4/16/2016	10	570225	6614338	MORTALITY
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	4/17/2016	n/a	n/a	n/a	VHF not detected; GPS data normal
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	4/17/2016	n/a	n/a	n/a	VHF not detected
BW052	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	4/17/2016	n/a	n/a	n/a	VHF not detected; GPS data normal

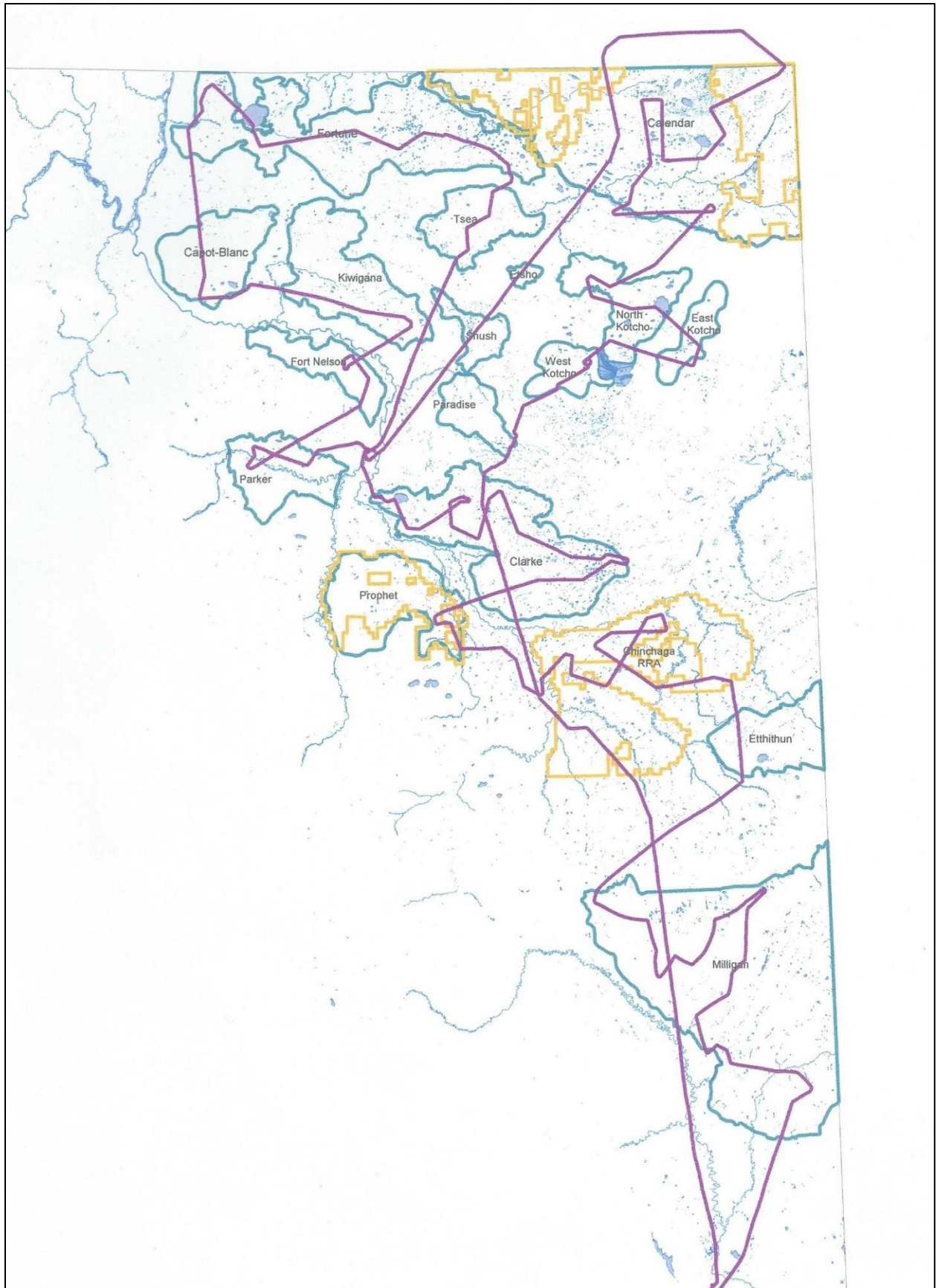


Figure 1. Flight paths flown during the April 16-17, 2016 OGRIS boreal caribou and wolf fixed-wing telemetry monitoring flight.