

# 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 – NOVEMBER 18-19, 2015

**Date:** November 30, 2015

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

#### *Executive Summary*

One hundred forty-four boreal caribou collar frequencies and 27 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted on November 18-19, 2015. One hundred thirty-seven caribou collars were heard transmitting normal VHF signals and 3 mortalities were detected. The VHF beacons of the remaining 4 caribou collars were not detected. These included: 1 SCEK ATS Iridium collar that has ceased Iridium data transmission and is believed to have failed (Calendar SCEK184), 1 Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) VHF collar whose battery is assumed to have expired after 7 years of activity (Kiwigana BC1009), 1 SCEK Vectronic GPS collars whose VHF beacon appears to be non-functional but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), and 1 Alberta VHF collar believed to be functional but not detected during the November flight (Milligan AB149.391).

The 3 mortality indications included SCEK212 (Clarke Vectronic Vertex) detected through GPS data transmission on November 03, SCEK021 (Clarke Lotek VHF) detected during the November 18 monitoring flight, and SCEK014B (Parker Vectronic Vertex) detected through GPS data transmission on November 20. One additional caribou mortality (SCEK203; Tsea Lotek Lifecycle) was detected and recovered subsequent to the October flight and prior to the November flight.

No wolf mortality signals were detected.

#### *Background*

Between December 17, 2012 and April 01, 2015, 224 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 November 18-19, 2015, Diversified Environmental Services (DES) conducted a fixed-wing

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 November 2015 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 the 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. In the case of GPS/satellite collars (ATS Iridium, Vectronic Vertex, and Lotek LifeCycle), additional diagnostic VHF beacon patterns were recorded where applicable. 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-four caribou collar frequencies were scanned during the November 18-19, 2015 monitoring flight, including 140 SCEK collars (5 ATS Iridium, 59 Vectronic Vertex, 9 Lotek LifeCycle, and 67 Lotek VHF), 3 previously-deployed MFLNRO VHF collars, and 1 Alberta VHF collar. In addition, 27 wolf collar frequencies were scanned during the November flight, including 20 SCEK wolf collars (12 Lotek Iridium, 1 Vectronic Vertex, and 7 Lotek VHF) and 7 University of Alberta/Nexen

collars (Lotek Iridium). Several SCEK Iridium wolf collars assumed to have exceeded their battery lives were not scanned.

Results of the November 2015 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 2,255 km. Of 144 caribou collar frequencies scanned, 137 normal VHF signals and 3 mortalities were detected. The VHF beacons of the remaining 4 caribou collars were not detected. These included 1 SCEK ATS Iridium collar that has ceased Iridium data transmission and is believed to have failed (Calendar SCEK184), 1 MFLNRO VHF collar whose battery is assumed to have expired after 7 years of activity (Kiwigana BC1009), 1 SCEK Vectronic GPS collars whose VHF beacon appears to be non-functional but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), and 1 Alberta VHF collar believed to be functional but not detected during the November flight (Milligan AB149.391).

Clarke mortality SCEK212 (Vectronic Vertex) was detected through GPS data transmission on November 03, 2015, prior to the November monitoring flight. Analysis of incoming GPS wolf data indicated the animal had been killed by the Elleh wolf pack on October 29. As the cause of death was already known, the ground investigation was postponed until after the November flight.

Clarke mortality SCEK021 (Lotek VHF) was first detected during the November 18 monitoring flight in close proximity to the SCEK212 mortality site.

Parker mortality SCEK014B (Vectronic Vertex) was detected through GPS data transmission on November 20, immediately following the November monitoring flight. This caribou made a pre-calving movement deep into the Rocky Mountains in May 2015 and has since remained out of VHF signal range. The mortality was detected during her protracted return to the Parker Core.

One additional caribou mortality (SCEK203; Tsea Lotek Lifecycle) was detected by satellite data and recovered between the October and November monitoring flights.

Calendar caribou SCEK125 returned to the Calendar Core prior to the November flight after spending the summer and fall beyond VHF detection range in the Northwest Territories. Bull caribou SCEK173 (West Kotcho ATS GPS) continues to transmit a normal VHF signal after ceasing GPS data transmission on July 28, 2015.

Twenty-seven wolf collar frequencies were scanned during the November 2015 monitoring flight, including 20 Lotek and Vectronic GPS/satellite collars and 7 Lotek VHF collars. No mortalities were

detected. Of the 20 GPS/satellite wolf collars scanned, 11 normal VHF signals were heard, 3 were not detected but were transmitting GPS data indicating normal activity, and 6 were not detected and had not transmitted recent GPS data.

Of the 7 VHF wolf collars scanned, 4 had normal VHF signals, 1 is assumed to have failed or the wolf dispersed soon after deployment in 2013 (BW007, Snake Pack), and the remaining 2 collars are assumed functional but were not 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 November 18-19, 2015 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	11/19/2015	10	631677	6629859	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	653334	6656116	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	11/19/2015	10	631650	6645306	normal
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	605987	6633524	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	641557	6651748	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	626700	6616563	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	612947	6641397	normal
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	639030	6645310	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	11/19/2015	10	625377	6651082	normal
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11/19/2015	10	632833	6623375	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	11/19/2015	10	636420	6649051	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11/19/2015	10	607241	6636425	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11/19/2015	10	635781	6643318	normal
SCEK181	Caribou	Calendar	Calendar	ATS-Irid	50 ppm; double 6th	11/19/2015	10	622880	6607392	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	11/19/2015	10	631212	6655629	normal
SCEK184	Caribou	Calendar	Calendar	ATS-Irid	not heard	11/19/2015	n/a	n/a	n/a	failed; last data Sep 23 14
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	50 ppm	11/19/2015	10	598461	6617498	normal
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	11/19/2015	10	590305	6622719	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	11/19/2015	10	649511	6661990	normal
SCEK108	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	11/19/2015	10	630054	6643547	normal
SCEK195	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	11/18/2015	10	652198	6403690	normal
SCEK224	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	11/18/2015	10	657878	6400343	normal
AB149.391	Caribou	Chinchaga	Milligan	unknown	60 ppm	11/18/2015	n/a	n/a	n/a	VHF signal not detected
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	659633	6299788	normal
SCEK027	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	662992	6301610	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	665850	6338494	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	653244	6323940	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	648699	6315770	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	11/18/2015	10	662864	6329059	normal
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	638417	6347407	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	615724	6360026	normal
SCEK040	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	11/18/2015	10	656282	6398803	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	673189	6331435	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	643102	6346749	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	664055	6341682	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	11/18/2015	10	665763	6340533	normal
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	658880	6324382	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	651667	6317223	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	629601	6354415	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	11/18/2015	10	667252	6338186	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	632332	6356924	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	11/18/2015	10	636615	6359851	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	649617	6308731	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	658761	6293924	normal
SCEK222	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	648747	6378832	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	11/18/2015	10	650621	6315034	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	11/18/2015	10	606456	6400550	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	11/18/2015	10	611582	6442402	normal
SCEK170	Caribou	Chinchaga	RRA-A	ATS-Irid	50 ppm; double 6th	11/18/2015	10	636336	6455303	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the November 18-19, 2015 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	11/18/2015	10	593525	6411206	normal
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	11/18/2015	10	609319	6450306	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	11/18/2015	10	606943	6454609	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	11/18/2015	10	614206	6447013	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	11/18/2015	10	625134	6452825	normal
SCEK216	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	11/18/2015	10	623357	6446081	VHF not heard since Apr 2015; GPS activity normal
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	11/18/2015	10	519516	6552817	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	11/18/2015	10	520020	6551903	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	11/18/2015	10	522559	6550735	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	11/18/2015	10	460465	6588024	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	11/18/2015	10	470220	6577926	normal
SCEK066	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	11/18/2015	10	463088	6583176	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	11/18/2015	10	463641	6580730	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	533018	6632482	normal
SCEK005b	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	485764	6612606	normal
SCEK078	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	466483	6626745	normal
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	84 ppm	11/18/2015	10	531430	6636276	normal
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	553581	6597509	normal
SCEK087	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	544855	6624007	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	522345	6632065	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	546438	6632010	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	546458	6628921	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	11/18/2015	10	528306	6634437	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	11/18/2015	10	481701	6628506	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	528782	6634140	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	546124	6628063	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	545899	6627500	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	545574	6626679	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	483379	6627593	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	11/18/2015	10	547174	6625591	normal
BC1009	Caribou	Maxhamish	Kiwigana	Lotek VHF	not heard	11/18/2015	n/a	n/a	n/a	VHF signal not detected
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	11/18/2015	10	480344	6628466	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	11/18/2015	10	520224	6574060	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	11/18/2015	10	553485	6595342	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	11/19/2015	10	550714	6565016	normal
SCEK169	Caribou	Maxhamish	Kiwigana	ATS-Irid	50 ppm; no double 6th	11/18/2015	10	515224	6580060	normal
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	11/18/2015	10	513145	6577780	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	11/18/2015	10	477761	6512424	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	11/18/2015	10	490425	6509496	normal
SCEK014b	Caribou	Parker	Parker	Vectr-VertexTD	not heard	11/18/2015	10	460738	6465355	VHF out of range (Tuchodi River); GPS MORT
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	11/18/2015	10	496819	6522148	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	11/18/2015	10	478637	6510007	normal
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	11/18/2015	10	495347	6522594	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	11/18/2015	10	548826	6467563	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	11/18/2015	10	555170	6458409	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	11/18/2015	10	552516	6465930	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	11/18/2015	10	581331	6444540	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	11/18/2015	10	565479	6453008	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	571703	6495717	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the November 18-19, 2015 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	11/18/2015	10	589735	6492061	normal
SCEK021	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	120 ppm	11/18/2015	10	558639	6503543	MORTALITY
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	560818	6498606	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	567113	6496537	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	563375	6507336	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	555326	6509948	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/19/2015	10	582389	6555292	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	598605	6477693	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	555919	6505501	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	573255	6497738	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	575976	6498166	normal
SCEK153	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	542698	6501396	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	558513	6506262	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	11/18/2015	10	560780	6495088	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	11/18/2015	10	600032	6478478	normal
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	11/18/2015	10	599773	6477558	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	11/18/2015	10	539429	6507126	normal
SCEK212	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	84 ppm	11/18/2015	10	558756	6503361	MORTALITY
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	11/18/2015	10	568320	6508567	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	11/18/2015	10	610297	6482898	normal
SCEK102	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	11/19/2015	10	628257	6553563	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	11/19/2015	10	625597	6556306	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	11/19/2015	10	634756	6567360	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11/19/2015	10	624155	6555316	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11/19/2015	10	610437	6557639	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11/19/2015	10	602287	6588434	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	11/19/2015	10	619147	6583908	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11/19/2015	10	629689	6578712	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11/19/2015	10	630400	6555689	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	11/19/2015	10	610337	6580064	normal
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11/19/2015	10	629825	6581982	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	11/19/2015	10	615432	6565743	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	11/19/2015	10	605167	6573846	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	11/19/2015	10	635826	6571544	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	11/19/2015	10	5571351	6497369	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	11/18/2015	10	559148	6595914	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	11/18/2015	10	555471	6595374	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	11/18/2015	10	553485	6595342	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	11/18/2015	10	548711	6598691	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	11/18/2015	10	551485	6595342	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	11/18/2015	10	555767	6585201	normal
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	11/19/2015	10	582676	6555528	normal
SCEK091	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	11/19/2015	10	606960	6582706	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	50 ppm; no double 6th	11/19/2015	10	584485	6564226	VHF normal; no data since July 28, 15
SCEK209	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	11/18/2015	10	532872	6571134	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	11/18/2015	10	566108	6596225	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the November 18-19, 2015 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	11/19/2015	n/a	n/a	n/a	VHF not detected
BW042	Wolf	Calendar	July	Lotek Iridium	50 ppm	11/19/2015	10	584202	6620049	VHF normal; GPS data normal
BW043	Wolf	Calendar	July	Lotek Iridium	50 ppm	11/19/2015	10	584091	6612656	VHF normal; GPS data normal
BW044	Wolf	Calendar	July	Lotek Iridium	50 ppm	11/19/2015	10	584091	6612656	VHF normal; GPS data normal
BW045	Wolf	Calendar	July	Lotek Iridium	50 ppm	11/19/2015	10	584091	6612656	VHF normal; GPS data normal
BW046	Wolf	Calendar	July	Lotek Iridium	50 ppm	11/19/2015	10	584091	6612656	VHF normal; GPS data normal
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	11/18/2015	10	619400	6327198	normal
BW038	Wolf	Clarke	Elleh	Vectronic	42 ppm	11/18/2015	10	548335	6493170	VHF normal; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	11/18/2015	10	548335	6493170	VHF normal; GPS data normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	11/18/2015	10	548335	6493170	VHF normal; GPS data normal
BW014	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; last data Sep 17, 15
BW048	Wolf	Fort Nelson	Tsimeh	Lotek VHF	60 ppm	11/19/2015	10	526427	6532265	normal
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; last data Oct 14, 15
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW047	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	11/19/2015	10	563755	6584197	VHF normal; GPS data normal
BW049	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	11/18/2015	10	549693	6604003	VHF normal; GPS data normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; last data Nov 06, 15
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW037	Wolf	Maxhamish	Fortune	Lotek VHF	60 ppm	11/18/2015	10	540379	6623810	normal
BW041	Wolf	Maxhamish	Fortune	Lotek Iridium	50 ppm	11/18/2015	10	550129	6607469	VHF normal; GPS data normal
BW030	Wolf	Snake-Sahtaneh	Clarke	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; last data Dec 28 14.
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	11/19/2015	n/a	n/a	n/a	VHF not detected; last data Feb 28 15
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	60 ppm	11/19/2015	10	616047	6582668	normal
BW007	Wolf	Snake-Sahtaneh	Snake	Lotek VHF	not heard	11/18/2015	n/a	n/a	n/a	not detected; missing since deployment
BW027	Wolf	Snake-Sahtaneh	Snake	Lotek Iridium	not heard	11/18/2015	n/a	n/a	n/a	VHF not detected; last data Jan 09, 14



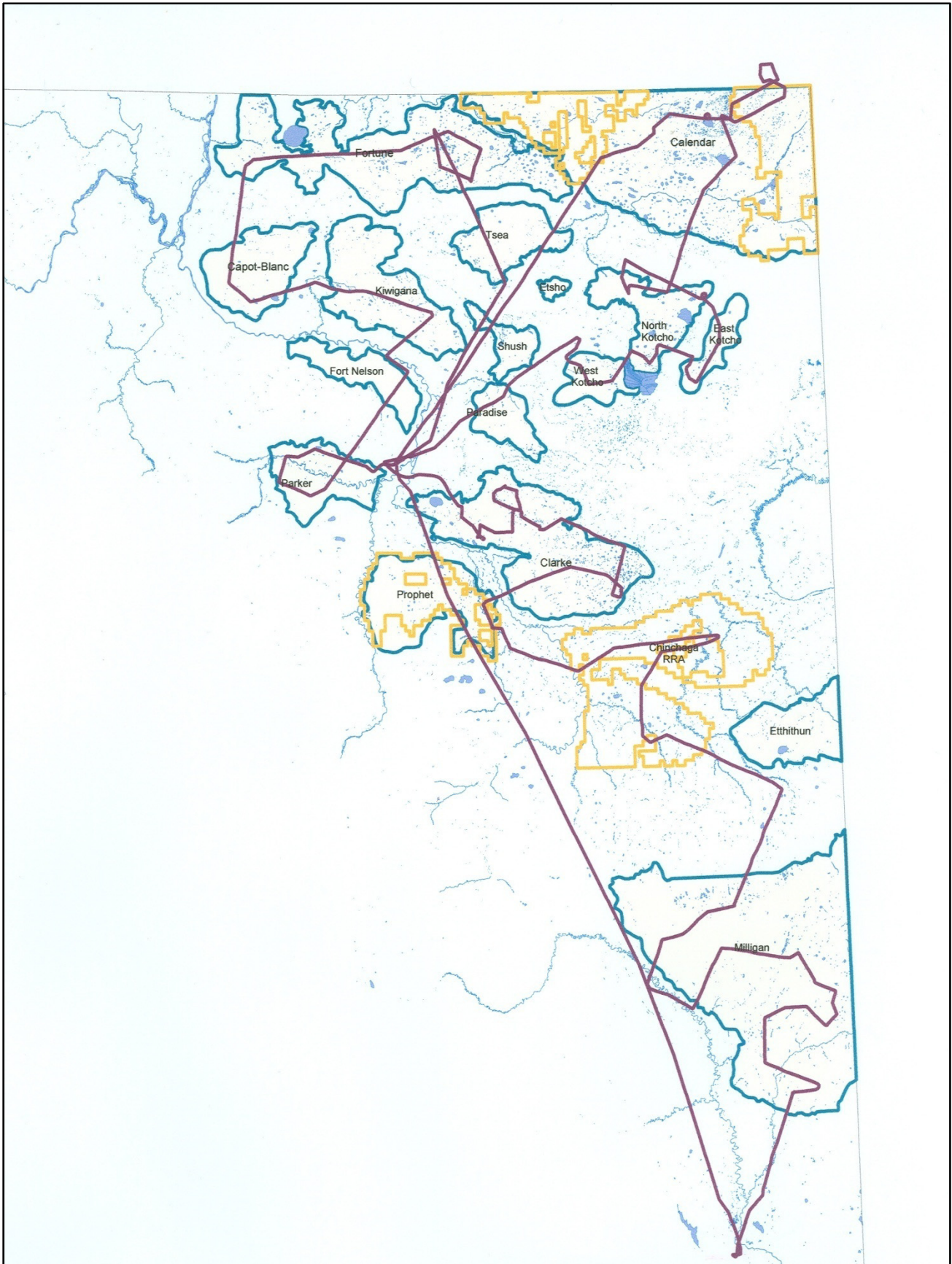


Figure 1. Flight paths flown during the November 18-19, 2015 OGRIS boreal caribou and wolf telemetry monitoring flight.