

# DIVERSIFIED ENVIRONMENTAL SERVICES

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

### FIXED-WING TELEMETRY MONITORING FLIGHT – DECEMBER 18-20, 2015

**Date:** December 31, 2015

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

#### *Executive Summary*

One hundred forty-one boreal caribou collar frequencies and 26 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted between December 18 and 20, 2015. One hundred thirty-three caribou collars were heard transmitting normal VHF signals and 1 mortality was detected. The VHF beacons of the remaining 7 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), 1 Alberta VHF collar assumed to have failed or moved out of the study area (Milligan AB149.391), and 3 GPS collars whose VHF beacons have been recently functional but whose GPS data transmission have ceased.

The single caribou mortality (Milligan Vectronic Vertex SCEK222) was detected through GPS data transmission review on December 15, 2015 and confirmed during the December 20 monitoring flight.

One collared wolf (Snake BW027) was killed by a land owner near Fort Nelson prior to the December flight and a second collared wolf (Fortune BW041) was heard on mortality and recovered during the December flight.

#### *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). Between December 18 and 20, 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 December 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 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-one caribou collar frequencies were scanned during the December 18-20, 2015 monitoring flight, including 137 SCEK collars (5 ATS Iridium, 56 Vectronic Vertex, 10 Lotek LifeCycle, and 66 Lotek VHF), 3 previously-deployed MFLNRO VHF collars, and 1 Alberta VHF collar. In addition, 26 wolf collar frequencies were scanned during the December flight, including 19 SCEK wolf collars (11 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. The December 2015 monitoring was conducted through a combination of opportunistic scanning during related and non-related helicopter operations on December 18 and a dedicated fixed-wing flight on December 20.

Results of the December 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 1,896 km. Of 141 caribou collar frequencies scanned, 133 normal VHF signals and 1 mortality signal were detected. The VHF beacons of the remaining 7 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 collar whose VHF beacon appears to be non-functional but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), 1 SCEK ATS Iridium collar whose VHF beacon has been recently operational but whose GPS data transmissions ceased in July 2015 (West Kotcho male SCEK173), 1 SCEK Vectronic GPS collar whose GPS data transmissions ceased in early December 2015 (Milligan SCEK034), 1 Lotek LifeCycle GPS collar whose GPS data transmissions ceased in mid-December 2015 (Clarke SCEK191), and 1 Alberta VHF collar assumed to have failed or moved out of the study area (Milligan AB149.391).

Milligan caribou mortality SCEK222 (Vectronic Vertex) was detected through GPS data transmission review on December 15, 2015. It's VHF beacon was confirmed to be transmitting in mortality mode during the December 20 monitoring flight.

Twenty-six wolf collar frequencies were scanned during the December 2015 monitoring flight, including 19 Lotek and Vectronic GPS/satellite collars and 7 Lotek VHF collars. One additional collared wolf (Snake BW027) was killed by a land owner at his residence outside Fort Nelson 10 days prior to the flight; the collar was returned to MFLNRO by mail. Of the 19 GPS/satellite wolf collars scanned, 12 normal VHF signals and 1 mortality signal were heard. Of the 6 GPS wolf collars not detected, 2 were transmitting GPS data indicating activity, and 4 had not transmitted recent GPS data.

Of the 7 VHF wolf collars scanned, 3 had normal VHF signals, 1 is assumed to have failed or the wolf dispersed soon after deployment in 2013 (Snake BW007), and the remaining 3 collars are assumed functional but were not detected.

Fortune wolf mortality BW041 was detected through GPS data transmission review on December 1, 2015 and investigated and recovered during the December 18 monitoring flight.

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

Cordially,

A handwritten signature in black ink, appearing to read "Brad Culling". The signature is fluid and cursive, with a period 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 December 18-20, 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	12/20/2015	10	639215	6653850	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	645318	6637709	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	12/20/2015	10	617367	6644269	normal
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	619456	6644135	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	639920	6646655	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	625723	6620347	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	637347	6640161	normal
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	624812	6648215	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	12/20/2015	10	642463	6655119	normal
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	12/20/2015	10	615103	6613252	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	12/20/2015	10	645015	6648677	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	12/20/2015	10	611976	6637136	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	12/20/2015	10	622660	6643243	normal
SCEK181	Caribou	Calendar	Calendar	ATS-Irid	50 ppm; no double 6th	12/20/2015	10	630134	6626262	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	12/20/2015	10	612806	6637662	normal
SCEK184	Caribou	Calendar	Calendar	ATS-Irid	not heard	12/20/2015	n/a	n/a	n/a	failed; last data Sep 23 14
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	50 ppm	12/20/2015	10	610928	6631658	normal
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	12/20/2015	10	613508	6638254	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	12/20/2015	10	638001	6653314	normal
SCEK108	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	12/20/2015	10	630247	6625014	normal
SCEK195	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	12/20/2015	10	652041	6406997	normal
SCEK224	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	12/20/2015	10	647885	6401300	normal
AB149.391	Caribou	Chinchaga	Milligan	unknown	not heard	12/20/2015	n/a	n/a	n/a	VHF signal not detected
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	659299	6296683	normal
SCEK027	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	664128	6299176	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	667288	6352248	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	664793	6329660	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	637454	6341821	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	12/20/2015	n/a	n/a	n/a	VHF signal not detected; last data Dec 7, 15
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	635275	6354142	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	622265	6363584	normal
SCEK040	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	12/20/2015	10	648288	6400956	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	643953	6335894	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	660717	6343192	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	630780	6348643	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	12/20/2015	10	632935	6339646	normal
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	661357	6336556	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	664565	6345327	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	646094	6363951	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	12/20/2015	10	663116	6355630	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	636222	6364165	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	12/20/2015	10	636685	6337216	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	644175	6334424	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	655946	6291250	normal
SCEK222	Caribou	Chinchaga	Milligan	Vectr-VertexTD	84 ppm	12/20/2015	10	658656	6378642	MORTALITY
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	12/20/2015	10	637835	6357629	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	12/20/2015	10	593550	6452180	normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	12/20/2015	10	630578	6442077	normal
SCEK170	Caribou	Chinchaga	RRA-A	ATS-Irid	50 ppm; double 6th	12/20/2015	10	629868	6443693	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the December 18-20, 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	12/20/2015	10	591739	6453796	normal
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	12/20/2015	10	616543	6464063	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	12/20/2015	10	588797	6454850	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	12/20/2015	10	630216	6442963	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	12/20/2015	10	622424	6449816	normal
SCEK216	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	12/20/2015	10	641247	6466896	VHF not heard since Apr 2015; GPS activity normal
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	12/20/2015	10	519040	6554156	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	12/20/2015	10	518987	6554099	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	12/20/2015	10	519160	6553652	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	12/18/2015	10	464633	6574823	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	12/18/2015	10	468364	6582433	normal
SCEK066	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	12/18/2015	10	463892	6580146	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	12/18/2015	10	466817	6580258	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	525120	6634777	normal
SCEK005b	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	486768	6628479	normal
SCEK078	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	467047	6624649	normal
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	84 ppm	12/18/2015	10	524018	6635894	normal
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	n/a	n/a	heard not located; VHF normal
SCEK087	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	537587	6635185	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	520816	6630513	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	528860	6639627	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	540489	6632099	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	12/18/2015	10	535167	6623303	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	12/18/2015	10	478773	6626815	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	526666	6635976	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	541127	6631825	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	541644	6631604	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	541125	6623127	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	474813	6638876	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	12/18/2015	10	540396	6624164	normal
BC1009	Caribou	Maxhamish	Kiwigana	Lotek VHF	not heard	12/18/2015	n/a	n/a	n/a	VHF signal not detected; battery assumed expired
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	12/18/2015	10	465726	6625167	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	12/18/2015	10	526998	6572149	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	12/18/2015	10	547005	6595034	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	12/18/2015	10	528448	6570098	normal
SCEK169	Caribou	Maxhamish	Kiwigana	ATS-Irid	50 ppm; double 6th	12/18/2015	10	509355	6574732	normal
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	12/18/2015	10	528735	6572035	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	12/18/2015	10	487841	6517942	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	12/18/2015	10	488868	6515485	normal
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	12/18/2015	10	485325	6520928	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	12/18/2015	10	495046	6518688	normal
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	12/18/2015	10	491321	6526216	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	12/20/2015	10	548105	6463765	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	12/20/2015	10	549178	6464723	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	12/20/2015	10	544646	6457915	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	12/20/2015	10	545956	6463177	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	12/20/2015	10	564188	6424714	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	577557	6500739	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	12/20/2015	10	589513	6487371	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the December 18-20, 2015 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	12/20/2015	10	572377	6498310	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	559443	6501222	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	575925	6498284	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	573544	6496484	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	587507	6554052	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	604293	6483262	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	576936	6501122	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	604002	6482665	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	594949	6491557	normal
SCEK153	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	536503	6505499	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	560944	6498740	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	12/20/2015	10	561761	6500467	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	not heard	12/20/2015	n/a	n/a	n/a	VHF signal not detected; last data Dec 14, 15
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	12/20/2015	10	607337	6478350	normal
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	12/20/2015	10	563118	6506478	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	12/20/2015	10	576150	6501619	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	12/20/2015	10	603149	6484151	normal
SCEK102	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	12/20/2015	10	634187	6558079	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	12/20/2015	10	637132	6558671	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	12/20/2015	10	623469	6575574	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	12/20/2015	10	631087	6554309	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	12/20/2015	10	588579	6553555	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	12/20/2015	10	603444	6591727	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	12/20/2015	10	626320	6580389	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	12/20/2015	10	623686	6580500	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	12/20/2015	10	637293	6556290	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	12/20/2015	10	597475	6571266	normal
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	12/20/2015	10	624812	6579612	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	12/20/2015	10	601631	6567730	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	12/20/2015	10	604087	6586027	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	12/20/2015	10	638886	6567160	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	12/20/2015	10	573698	6500979	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	12/18/2015	10	562379	6590038	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	12/18/2015	10	551320	6594456	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	12/18/2015	10	551811	6595289	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	12/18/2015	10	561000	6607428	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	12/18/2015	10	565493	6592120	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	12/18/2015	10	556313	6603167	normal
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	12/20/2015	10	597379	6552427	normal
SCEK091	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	12/20/2015	10	604156	6590965	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	not heard	12/20/2015	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	12/18/2015	10	527163	6572310	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	12/18/2015	10	552763	6607001	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the December 18-20, 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	60 ppm	12/20/2015	10	636441	6625895	normal
BW042	Wolf	Calendar	July	Lotek Iridium	50 ppm	12/20/2015	10	636441	6625895	VHF normal; GPS data normal
BW043	Wolf	Calendar	July	Lotek Iridium	50 ppm	12/20/2015	10	636441	6625895	VHF normal; GPS data normal
BW044	Wolf	Calendar	July	Lotek Iridium	50 ppm	12/20/2015	10	636441	6625895	VHF normal; GPS data normal
BW045	Wolf	Calendar	July	Lotek Iridium	50 ppm	12/20/2015	10	636441	6625895	VHF normal; GPS data normal
BW046	Wolf	Calendar	July	Lotek Iridium	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected; GPS data ceased Dec 21, 15
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected
BW038	Wolf	Clarke	Elleh	Vectronic	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected; GPS data normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	12/20/2015	10	578955	6488233	VHF normal; GPS data normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	12/20/2015	10	578955	6488233	VHF normal; GPS data normal
BW014	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	12/18/2015	n/a	n/a	n/a	VHF not detected; last data Sep 17, 15
BW048	Wolf	Fort Nelson	Tsimeh	Lotek VHF	not heard	12/18/2015	n/a	n/a	n/a	VHF not detected
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	12/18/2015	n/a	n/a	n/a	VHF not detected; last data Oct 14, 15
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	60 ppm	12/18/2015	10	566840	6599001	normal
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	12/18/2015	10	566840	6599001	VHF normal; GPS data normal
BW047	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	12/18/2015	10	566840	6599001	VHF normal; GPS data normal
BW049	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	12/18/2015	10	566840	6599001	VHF normal; GPS data normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	50 ppm	12/18/2015	10	566840	6599001	VHF normal; last data Nov 06, 15
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	50 ppm	12/18/2015	10	547374	6623310	VHF normal; Last GPS data Nov 22, 15
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	50 ppm	12/18/2015	10	547374	6623310	VHF normal; GPS data normal
BW037	Wolf	Maxhamish	Fortune	Lotek VHF	60 ppm	12/18/2015	10	547374	6623310	normal
BW041	Wolf	Maxhamish	Fortune	Lotek Iridium	50 ppm	12/18/2015	10	579618	6622788	MORTALITY
BW030	Wolf	Snake-Sahtaneh	Clarke	Lotek Iridium	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected; last data Dec 28 14.
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected; last data Feb 28 15
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	12/20/2015	n/a	n/a	n/a	VHF not detected
BW007	Wolf	Snake-Sahtaneh	Snake	Lotek VHF	not heard	12/20/2015	n/a	n/a	n/a	not detected; missing since deployment
BW027	Wolf	Snake-Sahtaneh	Snake	Lotek Iridium	not heard	12/09/2015	n/a	n/a	n/a	Hunter kill Dec 9; last data Jan 09, 14



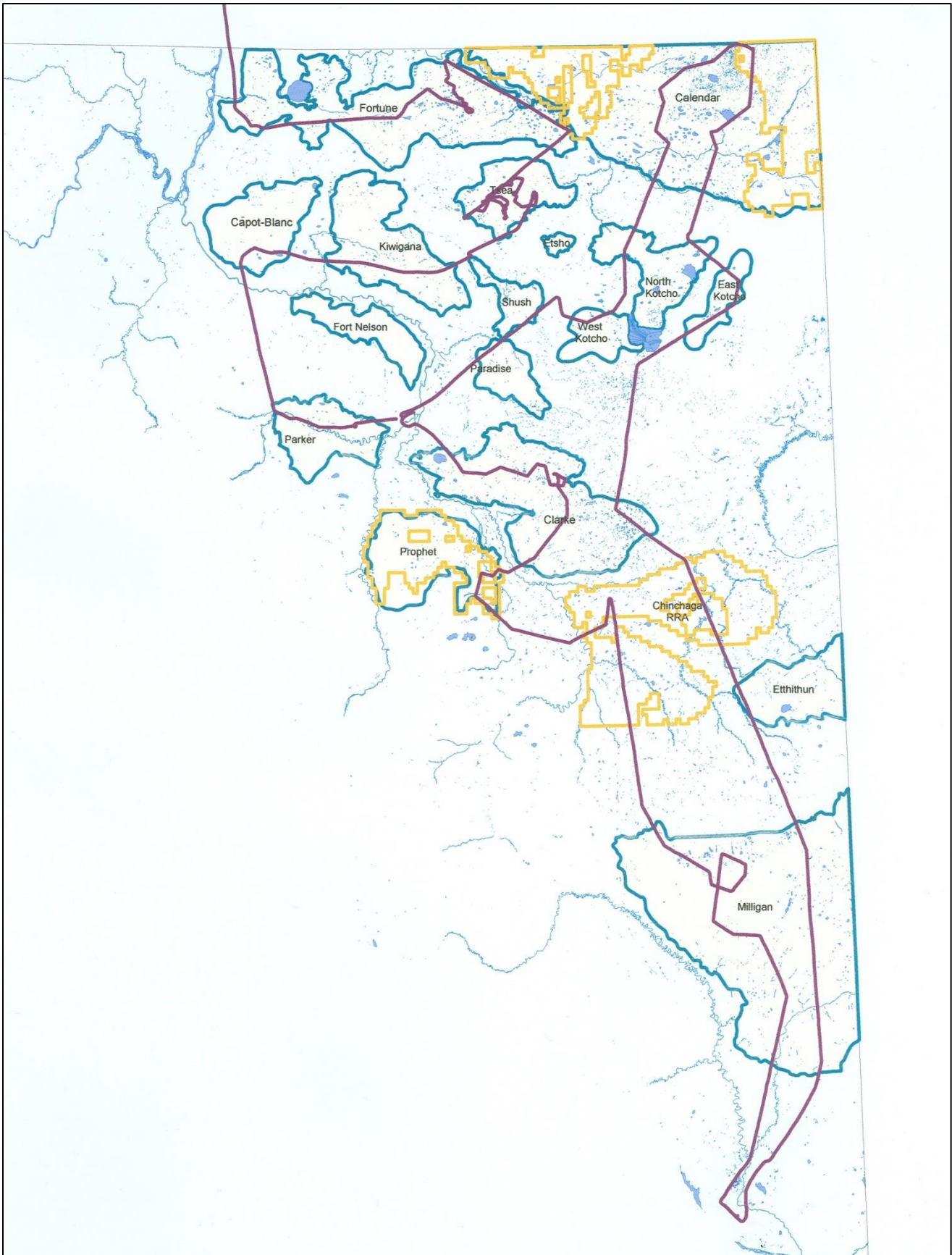


Figure 1. Flight paths flown during the December 18-20, 2015 OGRIS boreal caribou and wolf telemetry monitoring flight.