

# 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 – July 15-16, 2015

**Date:** July 31, 2015

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

#### *Executive Summary*

One hundred fifty-one boreal caribou collar frequencies and 27 wolf collar frequencies were scanned during a monthly fixed-wing telemetry monitoring flight conducted on July 15-16, 2015. One hundred forty-three caribou collars were heard transmitting normal VHF signals, 2 were transmitting mortality signals indicating dead animals (Capot-Blanc VHF SCEK001, Chinchaga VHF SCEK058), and 1 was transmitting a false mortality signal. At the time of the flight, GPS data from caribou SCEK171, suggested a potential mortality, however, the VHF beacon was not on mortality during the July 15 overflight. A helicopter investigation the following day confirmed the animal had died within a few hours of the fixed-wing flight.

The remaining 5 caribou collars were not detected. These included 2 believed to have failed (SCEK184, BC1009), 1 whose GPS data indicated normal activity well to the west of boreal caribou range (SCEK014B), 1 whose VHF beacon appears to have failed but whose GPS data transmissions indicate normal activity within the search area (SCEK216), and 1 assumed active but not detected within the normal search area (SCEK030). 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 July 15-16, 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 July 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 Ministry of Forests, Lands, and Natural Resource Operations (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 700-1,000 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 fifty-one caribou collar frequencies were scanned during the July 2015 monitoring flight, including 147 SCEK collars (5 ATS Iridium, 60 Vectronic Vertex, 11 Lotek LifeCycle, and 71 Lotek VHF), 3 previously-deployed MFLNRO VHF collars, and 1 Alberta VHF collar. In addition, 27 wolf collar frequencies were scanned during the July flight, including 20 SCEK wolf collars (12 Lotek Iridium, 1 Vectronic Vertex, and 7 Lotek VHF), and 7 Nexen collars (Lotek Iridium). Several SCEK Iridium wolf collars assumed to have exceeded their battery lives were not scanned.

Results of the July 15-16, 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 2,436 km. Of 151 caribou collar frequencies scanned, 143 normal VHF signals, 2 mortality signals (Capot-Blanc VHF SCEK001, Chinchaga VHF SCEK058), and 1 false mortality signal (Calendar Vectronic GPS SCEK119) were detected. In addition, GPS data from Chinchaga RRA Vectronic collar SCEK171 indicated atypical activity suggesting a recent mortality event, however, the VHF beacon was not on mortality during the July 15 overflight. A helicopter investigation the following day confirmed the animal had died within a few hours after the fixed-wing flight. 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 (Calendar SCEK184), 1 SCEK GPS collar whose GPS data transmissions indicated normal activity deep in the mountains to the west of boreal caribou range (Parker SCEK014B), 1 SCEK GPS collar whose VHF beacon appears to have failed but whose GPS data transmissions indicate normal activity within the search area (Chinchaga RRA SCEK216), 1 MFLNRO collar whose battery may have expired after 7 years of activity (Kiwigana BC1009), and 1 SCEK VHF collar assumed active but not detected during the July flight (Milligan SCEK030).

Twenty-seven wolf collar frequencies were scanned during the July 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, 4 normal VHF signals were heard, 13 were not detected but were transmitting GPS data indicating normal activity, and 3 are believed to have failed. GPS data from wolf BW051 (Tsimah Pack) indicate it remains well west of the project area, near the mouth of the Toad River.

Of the 7 VHF wolf collars scanned, 2 had normal VHF signals, a third is assumed to have failed or the wolf dispersed soon after deployment in 2013 (BW007, Snake Pack), and the remaining 4 collars are assumed operational 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 July 15-16, 2015 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK184	Caribou	Calendar	Calendar	ATS-Irid	not heard	7/16/2015	n/a	n/a	n/a	failed; last data Sep 23 14
SCEK185	Caribou	Calendar	Calendar	Lotek-Lifecycle	50 ppm	7/16/2015	10	583535	6636841	normal
SCEK183	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/16/2015	10	591569	6618355	normal
SCEK180	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/16/2015	10	606008	6666393	normal
SCEK181	Caribou	Calendar	Calendar	ATS-Irid	50 ppm; double 6th	7/16/2015	10	610732	6606220	normal
SCEK135	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	7/16/2015	10	645830	6646016	normal
SCEK119	Caribou	Calendar	Calendar	Vectr-Vertex	100 ppm	7/16/2015	10	614846	6641929	False mortality
SCEK146b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/16/2015	10	607917	6635767	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	604514	6623746	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	628469	6673248	normal
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	631498	6632012	normal
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	595149	6635157	normal
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	636346	6650808	normal
SCEK112	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	638262	6640234	normal
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	613180	6610844	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	7/16/2015	10	n/a	n/a	normal; heard in NT; not located
SCEK136b	Caribou	Calendar	Calendar	Vectr-VertexTD	42 ppm	7/16/2015	10	608683	6612393	normal
SCEK126b	Caribou	Calendar	RRA-C	Vectr-VertexTD	42 ppm	7/16/2015	10	596787	6659764	normal
SCEK108	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	7/16/2015	10	626446	6637638	normal
SCEK107	Caribou	Calendar	RRA-D	Lotek VHF	60 ppm	7/16/2015	10	609954	6640133	normal
SCEK195	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	7/15/2015	10	645826	6406455	normal
SCEK224	Caribou	Chinchaga	Etthithun	Vectr-VertexTD	42 ppm	7/15/2015	10	627666	6432006	normal
SCEK198	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	640365	6302676	normal
SCEK196	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	636397	6363516	normal
SCEK201	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	663369	6295262	normal
SCEK197	Caribou	Chinchaga	Milligan	Lotek-Lifecycle	50 ppm	7/15/2015	10	648409	6365498	VHF normal: no data since Mar 29 15
AB149.391	Caribou	Chinchaga	Milligan	unknown	not heard	7/15/2015	11	318539	6361822	normal
SCEK040	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	7/15/2015	10	642072	6413574	normal
SCEK034	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	7/15/2015	10	644297	6365926	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	628087	6342216	normal
SCEK055	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	7/15/2015	10	638914	6344991	normal
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	623503	6349833	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	644297	6364926	normal
SCEK027	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	670075	6295883	normal
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	661422	6366583	normal
SCEK029	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	641630	6317020	normal
SCEK053	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	622337	6347022	normal
SCEK030	Caribou	Chinchaga	Milligan	Lotek VHF	not heard	7/15/2015	n/a	n/a	n/a	VHF signal not detected
SCEK058	Caribou	Chinchaga	Milligan	Lotek VHF	120 ppm	7/15/2015	10	601979	6439933	MORTALITY
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	636133	6348337	normal
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	641984	6335590	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	624799	6335938	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	659859	6342382	normal
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	7/15/2015	10	582053	6363964	normal
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	675271	6295543	normal
SCEK222	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	667655	6370875	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	640027	6332039	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-VertexTD	42 ppm	7/15/2015	10	615882	6365308	normal
SCEK171	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	7/15/2015	10			normal
SCEK142	Caribou	Chinchaga	RRA-A	Vectr-Vertex	42 ppm	7/15/2015	10	626562	6456854	normal
SCEK189	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	7/15/2015	10	606374	6451874	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 15-16, 2015 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK170	Caribou	Chinchaga	RRA-A	ATS-Irid	50 ppm; double 6th	7/15/2015	10	636383	6441664	normal
SCEK213	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	7/15/2015	10	602495	6448875	normal
SCEK215	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	7/15/2015	10	637418	6440539	normal
SCEK048	Caribou	Chinchaga	RRA-A	Lotek VHF	60 ppm	7/15/2015	10	601510	6405058	normal
SCEK216	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	not heard	7/15/2015	10	619851	6450670	VHF not heard since Apr 2015; GPS activity normal
SCEK172	Caribou	Chinchaga	RRA-A	Lotek-Lifecycle	50 ppm	7/15/2015	10	589936	6437544	normal
SCEK214	Caribou	Chinchaga	RRA-A	Vectr-VertexTD	42 ppm	7/15/2015	10	613431	6424138	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	7/15/2015	10	518683	6546979	normal
SCEK167	Caribou	Fort Nelson	Fort Nelson	Lotek-Lifecycle	50 ppm	7/15/2015	10	521083	6545683	normal
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-VertexTD	42 ppm	7/15/2015	10	501995	6556367	normal
BC1014	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	7/15/2015	10	443105	6562989	normal
SCEK001	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	120 ppm	7/15/2015	10	473498	6579952	MORTALITY
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	7/15/2015	10	459773	6580338	normal
SCEK066	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	7/15/2015	10	445111	6570840	normal
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-VertexTD	42 ppm	7/15/2015	10	443105	6564989	normal
BC1033	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	509012	6623392	normal
SCEK178	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	545211	6621505	normal
SCEK085	Caribou	Maxhamish	Fortune	Vectr-Vertex	42 ppm	7/15/2015	10	535110	6623272	normal
SCEK005b	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	483913	6613636	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	527796	6631752	normal
SCEK208	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	486494	6627243	normal
SCEK175	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	7/15/2015	10	491650	6628444	normal
SCEK205	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	542748	6628823	normal
SCEK179	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	7/15/2015	10	534185	6634084	normal
SCEK176	Caribou	Maxhamish	Fortune	Lotek-Lifecycle	50 ppm	7/15/2015	10	483382	6627495	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	538452	6619276	normal
SCEK078	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	463101	6622603	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	525497	6632950	normal
SCEK086	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	527734	6632128	normal
SCEK206	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	535853	6625184	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	540407	6626823	normal
SCEK087	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	540167	6622646	normal
SCEK221	Caribou	Maxhamish	Fortune	Vectr-VertexTD	42 ppm	7/15/2015	10	543551	6628315	normal
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	7/15/2015	10	547928	6561386	normal
SCEK169	Caribou	Maxhamish	Kiwigana	ATS-Irid	50 ppm; double 6th	7/15/2015	10	500500	6588609	normal
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-VertexTD	42 ppm	7/15/2015	10	529198	6569118	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	7/15/2015	10	504290	6579531	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	7/15/2015	10	526908	6571605	normal
SCEK004	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	7/15/2015	10	466371	6623308	normal
BC1009	Caribou	Maxhamish	Kiwigana	Lotek VHF	not heard	7/15/2015	n/a	n/a	n/a	VHF signal not detected
SCEK194	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	7/15/2015	10	483007	6521291	normal
SCEK010	Caribou	Parker	Parker	Lotek VHF	60 ppm	7/15/2015	10	489908	6501436	normal
SCEK012	Caribou	Parker	Parker	Lotek VHF	60 ppm	7/15/2015	10	497838	6513266	normal
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	7/15/2015	10	488263	6520195	normal
SCEK016b	Caribou	Parker	Parker	Vectr-VertexTD	42 ppm	7/15/2015	10	475000	6518176	normal
SCEK014b	Caribou	Parker	Parker	Vectr-VertexTD	not heard	7/15/2015	10	415222	6437231	VHF out of range (Tuchodi Lakes); GPS normal
SCEK217	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	7/15/2015	10	550927	6448232	normal
SCEK051	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	7/15/2015	10	538160	6481949	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	7/15/2015	10	553718	6447348	normal
SCEK045	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	7/15/2015	10	549522	6457323	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-VertexTD	42 ppm	7/15/2015	10	553284	6463329	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 15-16, 2015 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK193	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/15/2015	10	535925	6504014	normal
SCEK212	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/15/2015	10	557389	6501642	normal
SCEK192	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	7/15/2015	10	601118	6477705	normal
SCEK191	Caribou	Snake-Sahtaneh	Clarke	Lotek-Lifecycle	50 ppm	7/15/2015	10	602914	6480490	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/16/2015	10	587808	6550313	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/16/2015	10	563279	6538402	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	605187	6484199	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	610243	6486387	normal
SCEK153	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	543964	6498209	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	559117	6506672	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	567782	6508216	normal
SCEK021	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	556353	6503460	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	558467	6499901	normal
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	570201	6499162	normal
SCEK149	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	576255	6497833	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	539524	6499306	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	569308	6500926	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	7/15/2015	10	572430	6496869	normal
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/15/2015	10	609097	6482381	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/16/2015	10	555873	6539828	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-VertexTD	42 ppm	7/15/2015	10	567701	6468459	normal
SCEK103	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	7/16/2015	10	638805	6564125	normal
SCEK102	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	7/16/2015	10	627012	6553468	normal
SCEK105	Caribou	Snake-Sahtaneh	East Kotcho	Lotek VHF	60 ppm	7/16/2015	10	641187	6576759	normal
SCEK182	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/16/2015	10	597540	6591392	normal
SCEK186	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/16/2015	10	594713	6572861	normal
SCEK204	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	7/16/2015	10	638310	6566713	normal
SCEK097b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/16/2015	10	596922	6589661	normal
SCEK187	Caribou	Snake-Sahtaneh	North Kotcho	Lotek-Lifecycle	50 ppm	7/16/2015	10	604244	6562805	normal
SCEK111	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-Vertex	42 ppm	7/16/2015	10	596161	6592929	normal
SCEK100b	Caribou	Snake-Sahtaneh	North Kotcho	Vectr-VertexTD	42 ppm	7/16/2015	10	641589	6571891	normal
SCEK089	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/16/2015	10	595615	6568136	normal
SCEK088	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/16/2015	10	633617	6555464	normal
SCEK090	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/16/2015	10	597829	6589067	normal
SCEK092	Caribou	Snake-Sahtaneh	North Kotcho	Lotek VHF	60 ppm	7/16/2015	10	603042	6592645	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	7/16/2015	10	559695	6537299	normal
SCEK203	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	7/15/2015	10	554732	6608093	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	7/15/2015	10	555452	6594550	normal
SCEK081	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	7/15/2015	10	552701	6607342	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	7/15/2015	10	549679	6595367	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	7/15/2015	10	553582	6597223	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	7/15/2015	10	560259	6605716	normal
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-VertexTD	42 ppm	7/15/2015	10	531986	6605240	normal
SCEK173	Caribou	Snake-Sahtaneh	West Kotcho	ATS-Irid	50 ppm; no double 6th	7/15/2015	10	583738	6520040	normal
SCEK071	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-Vertex	42 ppm	7/16/2015	10	586220	6547443	normal
SCEK209	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	7/15/2015	10	522756	6570158	normal
SCEK091	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	7/16/2015	10	599787	6584383	normal
SCEK073	Caribou	Snake-Sahtaneh	West Kotcho	Lotek VHF	60 ppm	7/16/2015	10	596321	6547921	normal
SCEK219	Caribou	Snake-Sahtaneh	West Kotcho	Vectr-VertexTD	42 ppm	7/15/2015	10	557890	6608530	normal

Table 1 cont. VHF signal status and location of boreal caribou and wolf collars detected during the July 15-16, 2015 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
BW046	Wolf	Calendar	July	Lotek Iridium	50 ppm	7/16/2015	10	616624	6612249	normal
BW044	Wolf	Calendar	July	Lotek Iridium	50 ppm	7/16/2015	10	616624	6612249	normal
BW045	Wolf	Calendar	July	Lotek Iridium	50 ppm	7/16/2015	10	604392	6615441	normal
BW034	Wolf	Calendar	July	Lotek VHF	not heard	7/16/2015	n/a	n/a	n/a	VHF not detected
BW042	Wolf	Calendar	July	Lotek Iridium	not heard	7/16/2015	n/a	n/a	n/a	VHF not detected
BW043	Wolf	Calendar	July	Lotek Iridium	not heard	7/16/2015	n/a	n/a	n/a	VHF not detected
BW002	Wolf	Chinchaga	Big Arrow	Lotek VHF	60 ppm	7/15/2015	10	631888	6325091	normal
BW038	Wolf	Clarke	Elleh	Vectronic	50 ppm	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW040	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW039	Wolf	Clarke	Elleh	Lotek Iridium	50 ppm	7/15/2015	10	567102	6505486	normal
BW014	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW051	Wolf	Fort Nelson	Tsimeh	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF out of range (Liard River); GPS activity normal
BW048	Wolf	Fort Nelson	Tsimeh	Lotek VHF	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected
BW047	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected
BW049	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected
BW032	Wolf	Fortune/Tsea	Petitot	Lotek VHF	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected
BW033	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW050	Wolf	Fortune/Tsea	Petitot	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW036	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW035	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW037	Wolf	Maxhamish	Fortune	Lotek VHF	60 ppm	7/15/2015	10	535907	6637135	normal
BW041	Wolf	Maxhamish	Fortune	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; GPS activity normal
BW030	Wolf	Snake-Sahtaneh	Clarke	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; last data Dec 28 14.
BW024	Wolf	Snake-Sahtaneh	Kwokullie	Lotek Iridium	not heard	7/16/2015	n/a	n/a	n/a	VHF not detected; last data Feb 28 15
BW026	Wolf	Snake-Sahtaneh	Kwokullie	Lotek VHF	not heard	7/16/2015	n/a	n/a	n/a	VHF not detected
BW007	Wolf	Snake-Sahtaneh	Snake	Lotek VHF	not heard	7/15/2015	n/a	n/a	n/a	not detected; missing since deployment
BW027	Wolf	Snake-Sahtaneh	Snake	Lotek Iridium	not heard	7/15/2015	n/a	n/a	n/a	VHF not detected; last data Jan 09, 14

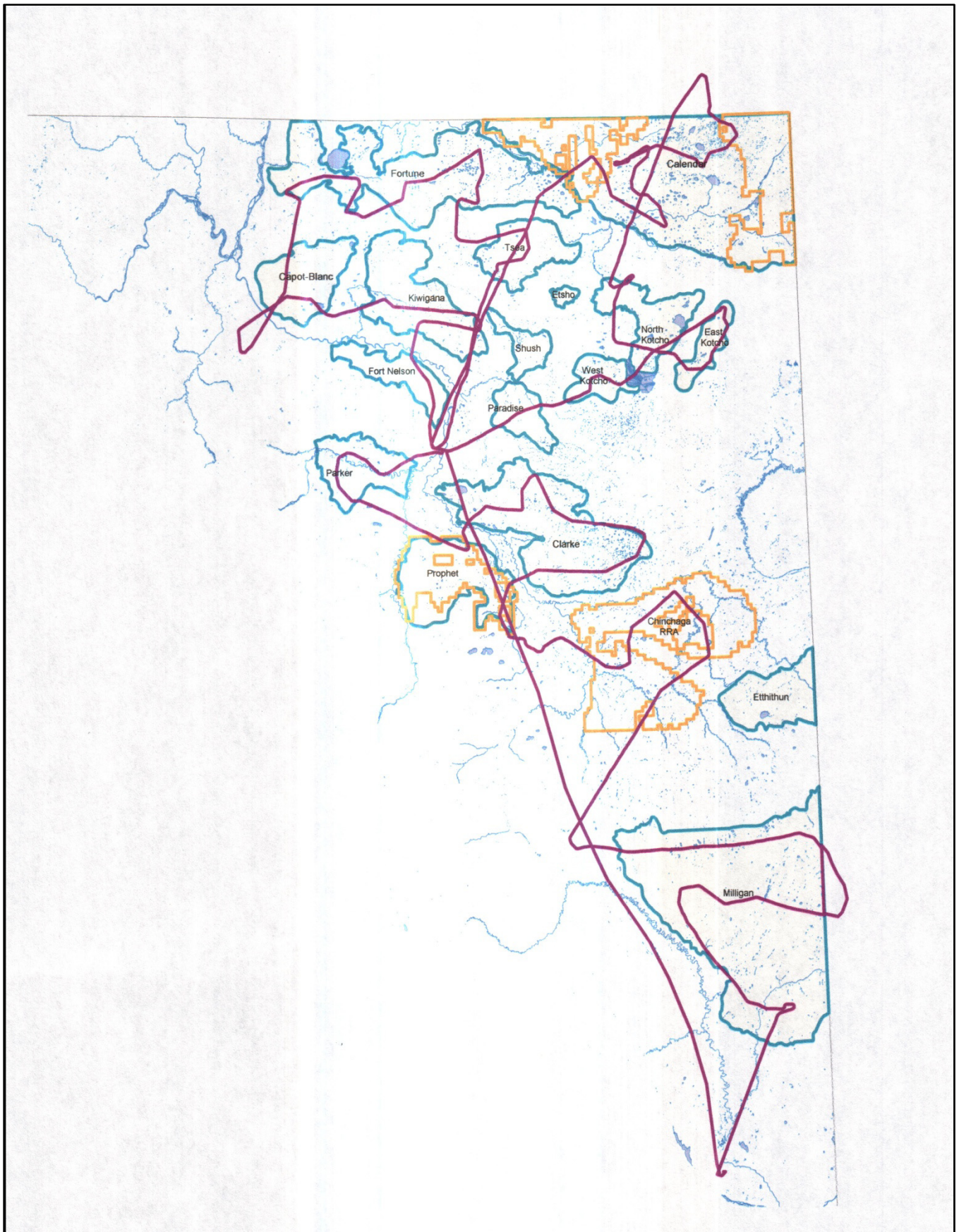


Figure 1. Flight paths flown during the July 15-16, 2015 OGRIS boreal caribou and wolf telemetry monitoring flight.