

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 24-26, 2018

Date: Apr 28, 2018

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

Executive Summary

On April 24 & 26, 2018, 92 boreal caribou collar frequencies were scanned during a scheduled fixed-wing telemetry monitoring flight. Of the 92 caribou collars scanned, 69 were heard transmitting normal VHF signals and one was transmitting a VHF mortality signal (Clarke GPS SCEK218). The remaining 22 collars were not detected, including 21 that were assumed to have recently exceeded their battery lives. As of April 26, 2018, forty-eight Lotek VHF collars, 14 Vectronic GPS collars, and 7 Lotek LifeCycle collars remain active in BC's boreal caribou ranges. One additional Lotek LifeCycle collar is active in the BC Hay River drainage near the Alberta border.

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). These radio-collars are monitored by fixed-wing telemetry flights conducted at regular intervals throughout the year. Information collected is used to identify caribou mortalities and estimate annual adult female survival rate and population trend.

On April 24 & 26, 2018, 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).

Objectives

The objective of the April 24 & 26, 2018 monitoring flight was to determine the approximate location and VHF beacon status of all boreal caribou collars believed to be active in BC's boreal caribou ranges. These included caribou collars deployed on behalf of OGRIS (*hereafter*, SCEK collars) and caribou collars deployed on behalf of the Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) in 2012 and 2018.

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 1,000-1,500 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

During the April 24 & 26, 2018 monitoring flight, 92 caribou collar frequencies were scanned, including 84 SCEK collars (35 Vectronic Vertex and 49 Lotek VHF), 1 MFLNRO VHF collar deployed in 2012 and 7 MFLNRO VHF collars deployed in March 2018. One additional MFLNRO GPS boreal caribou collar deployed outside the search area in 2018 was not scanned (Hay River area, BC).

Results of the April 2018 monitoring flight are presented in Table 1. Flight paths searched within and adjacent to each boreal caribou core habitat area are shown in Figure 1. Total flight line distance was 2,267 km. Of 92 caribou collar frequencies scanned, 69 were transmitting normal VHF signals and 1 was transmitting a VHF mortality signal (Clarke GPS SCEK218); transmitted GPS data indicated that the animal died on April 16, 2018.

The remaining 22 caribou collars were not detected during the April 2018 flight. These included 20 expired Vectronic GPS collars that ceased GPS data transmission within 4 months prior to the April

flight, 1 MFLNRO VHF collar believed to have recently exceeded its battery life (Tsea VHF BC1028), and 1 SCEK VHF collar that may have moved beyond the search area (Milligan VHF SCEK059).

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
Diversified Environmental Services
Fort St. John, BC

Table 1. VHF signal status and location of boreal caribou collars detected during the April 24 & 26, 2018 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK107	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	636617	6661326	normal
SCEK112	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	n/a	n/a	normal VHF heard but not located; in NWT
SCEK113	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	645885	6628360	normal
SCEK120	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	612401	6628630	normal
SCEK122	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	636715	6673122	normal
SCEK123	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	610360	6609230	normal
SCEK125	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	657381	6675992	normal
SCEK126b	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 20, 18
SCEK134	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	610065	6610960	normal
SCEK136b	Caribou	Calendar	Calendar	Vectr-Vertex	42 ppm	26-Apr-18	10	630349	6621925	VHF normal; last data Apr 9, 18
SCEK137	Caribou	Calendar	Calendar	Lotek VHF	60 ppm	26-Apr-18	10	647088	6639717	normal
SCEK146b	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Dec 23, 17
SCEK181b	Caribou	Calendar	Calendar	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 11, 18
BC18-01	Caribou	Chinchaga	Chin North	Lifecycle	50 ppm	24-Apr-18	10	597251	6452546	normal
SCEK048	Caribou	Chinchaga	Chin North	Lotek VHF	60 ppm	24-Apr-18	10	607753	6443960	normal
SCEK213	Caribou	Chinchaga	Chin North	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Jan 20, 18
SCEK214	Caribou	Chinchaga	Chin North	Vectr-Vertex	42 ppm	24-Apr-18	10	591164	6452956	normal
SCEK215	Caribou	Chinchaga	Chin North	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Jan 23, 18
SCEK026b	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 15, 2018
SCEK032	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	635770	6357019	normal
SCEK033b	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Jan 23, 2018
SCEK035	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	616790	6351915	normal
SCEK036b	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	24-Apr-18	10	619520	6368408	normal
SCEK041	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	611691	6358088	normal
SCEK054	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	643095	6361437	normal
SCEK057	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	617396	6351470	normal
SCEK059	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	n/a	n/a	n/a	VHF not detected
SCEK060	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	619035	6350277	normal
SCEK061	Caribou	Chinchaga	Milligan	Lotek VHF	60 ppm	24-Apr-18	10	662343	6329911	normal
SCEK223	Caribou	Chinchaga	Milligan	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 20, 18
SCEK226	Caribou	Chinchaga	Milligan	Vectr-Vertex	42 ppm	24-Apr-18	10	660774	6298084	normal
SCEK009b	Caribou	Fort Nelson	Fort Nelson	Vectr-Vertex	42 ppm	26-Apr-18	10	522670	6546049	normal
SCEK166	Caribou	Fort Nelson	Fort Nelson	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Dec 17, 17
SCEK007b	Caribou	Maxhamish	Capot-Blanc	Vectr-Vertex	42 ppm	26-Apr-18	10	455423	6579037	normal
SCEK076	Caribou	Maxhamish	Capot-Blanc	Lotek VHF	60 ppm	26-Apr-18	10	470557	6577724	normal
SCEK128	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	26-Apr-18	10	534853	6632589	normal
SCEK129	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	26-Apr-18	10	547351	6629419	normal
SCEK164	Caribou	Maxhamish	Fortune	Lotek VHF	60 ppm	26-Apr-18	10	539550	6631801	normal
SCEK177	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Jan 17, 18
SCEK205	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 16, 18
SCEK206	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Feb 13, 18
SCEK221	Caribou	Maxhamish	Fortune	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Feb 17, 18
BC18-06	Caribou	Maxhamish	Kiwigana	Lifecycle	50 ppm	24-Apr-18	10	524677	6568496	normal
BC18-07	Caribou	Maxhamish	Kiwigana	Lifecycle	50 ppm	24-Apr-18	10	521782	6569560	normal
SCEK062	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	26-Apr-18	10	516463	6571025	normal
SCEK064	Caribou	Maxhamish	Kiwigana	Lotek VHF	60 ppm	26-Apr-18	10	526404	6568710	normal

Table 1 cont. VHF signal status and location of boreal caribou collars detected during the April 24 & 26, 2018 OGRIS fixed-wing telemetry monitoring flight.

ID	Species	Range	Core	Collar Type	Status	Date	Zone	East	North	Comments
SCEK168	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Dec 15, 17
SCEK211	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Dec 18, 17
SCEK231	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Feb 20, 18
SCEK232	Caribou	Maxhamish	Kiwigana	Vectr-Vertex	42 ppm	26-Apr-18	10	527899	6569418	VHF signal detected; last data Jun 01, 17
SCEK015	Caribou	Parker	Parker	Lotek VHF	60 ppm	26-Apr-18	10	492902	6524244	normal
SCEK049	Caribou	Prophet	Prophet	Lotek VHF	60 ppm	24-Apr-18	10	542108	6453545	normal
SCEK161b	Caribou	Prophet	Prophet	Vectr-Vertex	42 ppm	24-Apr-18	10	618777	6447071	normal
SCEK217	Caribou	Prophet	Prophet	Vectr-Vertex	not heard	24-Apr-18	n/a	n/a	n/a	VHF not detected; last data Jan 19, 18
BC18-02	Caribou	Snake-Sahtaneh	Clarke	Lifecycle	50 ppm	24-Apr-18	10	565184	6503952	normal
BC18-03	Caribou	Snake-Sahtaneh	Clarke	Lifecycle	50 ppm	24-Apr-18	10	563467	6507153	normal
BC18-05	Caribou	Snake-Sahtaneh	Clarke	Lifecycle	50 ppm	24-Apr-18	10	552275	6507047	normal
SCEK019	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	566531	6500244	normal
SCEK020b	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	24-Apr-18	10	583021	6468366	normal
SCEK024	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	563611	6498300	normal
SCEK025	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	560593	6499011	normal
SCEK068	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	565435	6504785	normal
SCEK070	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	580102	6498614	normal
SCEK145	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	591833	6545755	normal
SCEK148	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	539847	6457635	normal
SCEK150	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	566375	6497753	normal
SCEK152	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	558760	6496341	normal
SCEK156	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	594576	6485195	normal
SCEK157	Caribou	Snake-Sahtaneh	Clarke	Lotek VHF	60 ppm	24-Apr-18	10	557192	6495716	normal
SCEK218	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	84 ppm	24-Apr-18	10	576641	6499284	MORTALITY; GPS alert Apr 16, 18
SCEK220	Caribou	Snake-Sahtaneh	Clarke	Vectr-Vertex	42 ppm	24-Apr-18	10	599008	6482715	normal
BC18-08	Caribou	Snake-Sahtaneh	Kotcho	Lifecycle	50 ppm	24-Apr-18	10	605059	6589803	normal
SCEK088	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	630186	6555996	normal
SCEK089	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	606232	6572782	normal
SCEK090	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	603134	6573665	normal
SCEK091	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	606643	6571485	normal
SCEK092	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	609681	6591561	normal
SCEK097b	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Mar 15, 18
SCEK100b	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Feb 13, 18
SCEK103	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	625918	6552089	normal
SCEK105	Caribou	Snake-Sahtaneh	Kotcho	Lotek VHF	60 ppm	26-Apr-18	10	636330	6566020	normal
SCEK209	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last data Dec 17, 17
SCEK219	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	42 ppm	26-Apr-18	10	548437	6611764	normal
SCEK229	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	42 ppm	26-Apr-18	10	615452	6570329	normal
SCEK230	Caribou	Snake-Sahtaneh	Kotcho	Vectr-Vertex	42 ppm	26-Apr-18	10	587979	6581411	normal
SCEK096	Caribou	Snake-Sahtaneh	Paradise	Lotek VHF	60 ppm	24-Apr-18	10	555366	6494941	normal
BC1028	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	not heard	26-Apr-18	n/a	n/a	n/a	VHF not detected; last heard Dec 2017
SCEK079b	Caribou	Snake-Sahtaneh	Tsea	Vectr-Vertex	42 ppm	26-Apr-18	10	554732	6584891	normal
SCEK082	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	26-Apr-18	10	560647	6601968	normal
SCEK127	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	26-Apr-18	10	554112	6609488	normal
SCEK131	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	26-Apr-18	10	553124	6591730	normal
SCEK132	Caribou	Snake-Sahtaneh	Tsea	Lotek VHF	60 ppm	26-Apr-18	10	553754	6594104	normal

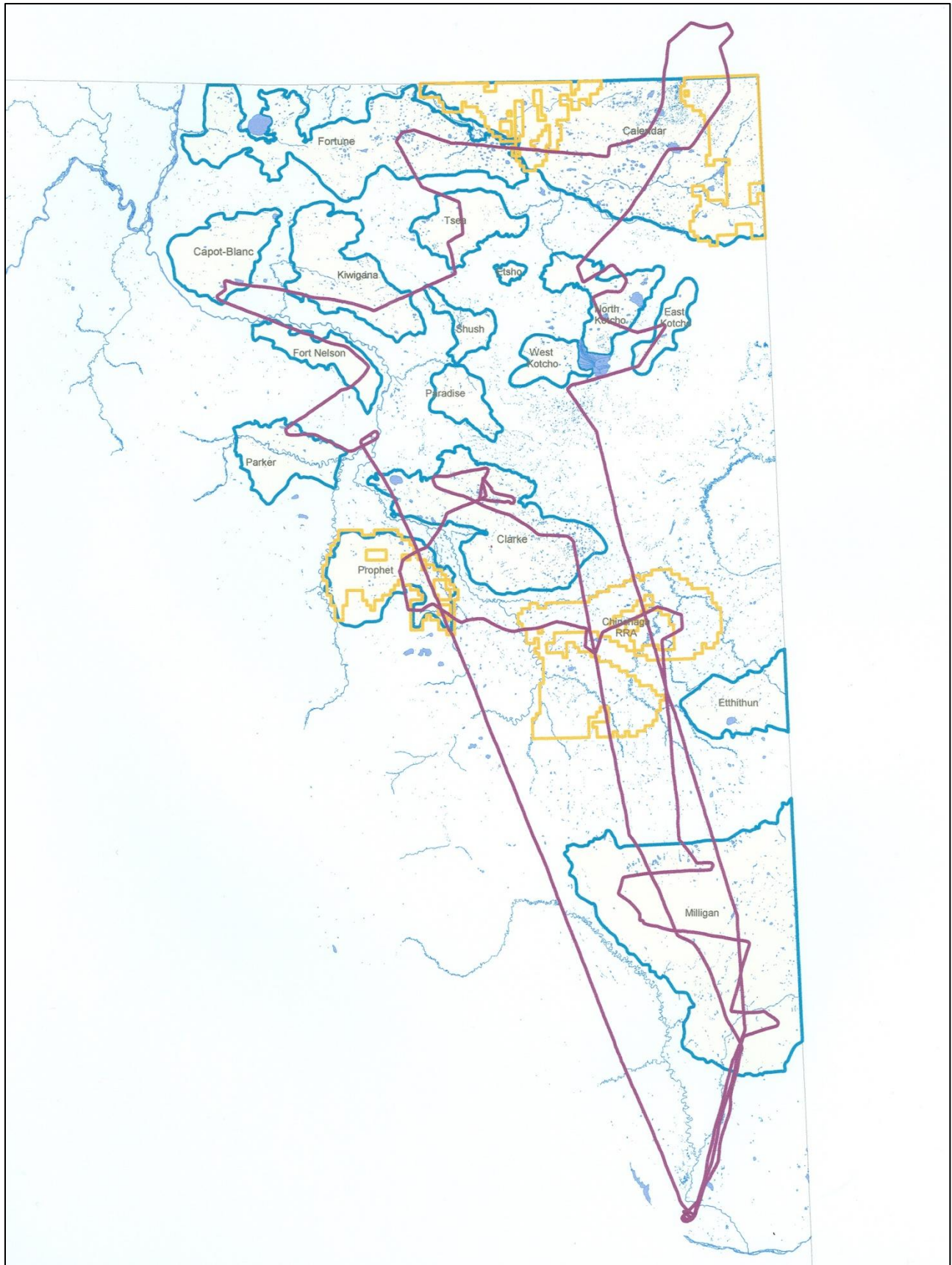


Figure 1. Flight paths flown during the April 24 & 26, 2018 OGRIS boreal caribou fixed-wing telemetry monitoring flight.