

# DIVERSIFIED ENVIRONMENTAL SERVICES

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## SCIENCE COMMUNITY ENVIRONMENTAL KNOWLEDGE FUND BOREAL CARIBOU TELEMETRY PROGRAM

### FIXED-WING TELEMETRY MONITORING FLIGHT – October 03-04, 2013

**Date:** October 5, 2013

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#### *Background*

During the winter of 2012-13, 164 adult female boreal caribou were radio-collared in British Columbia's boreal caribou ranges as part of the *British Columbia Boreal Caribou Implementation Plan* (BCIP). On October 3-4, 2013, Diversified Environmental Services (DES) conducted a fixed-wing monitoring flight under contract to the Science 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/collar recoveries and to track potential long distance seasonal movements of VHF-collared caribou.

#### *Objectives*

The objective of the October 3-4, 2013 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 at the time of the flight. These included caribou collars deployed on behalf of SCEK, caribou and wolf collars deployed on behalf of MFLNRO, 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 a Lotek™ STR 1000 telemetry receiver. 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 (120 ppm) and a location (+/- 1 km) was recorded using a hand-held GPS unit. In the case of GPS/satellite collars (ATS Iridium and Vectronic Vertex), additional diagnostic VHF beacon patterns were recorded where applicable. As GPS/satellite collars are programmed to log multiple daily locations with high precision, efforts to obtain collar locations during fixed-wing flights are not necessary. Therefore, waypoints for GPS/satellite collars were typically recorded at the location from which the collar was heard, unless the VHF beacon status indicated a collar malfunction or mortality, in which case more precise locations were obtained.

#### *Results*

One hundred forty-two caribou collar frequencies were scanned during the October 3-4, 2013 monitoring flight, including 131 SCEK collars (27 ATS Iridium, 14 Vectronic Vertex, and 90 VHF), 2 Alberta SRM collars, and 9 previously-deployed MFLNRO collars (1 ATS Iridium and 8 VHF). In addition, the frequencies of 14 Lotek Iridium and 6 Lotek VHF wolf collars were scanned.

Results of the October 3-4 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 2,829 km. Of 142 caribou collar frequencies scanned, 137 normal VHF signals and 1 false mortality signal were detected. The false mortality (ATS Iridium; SCEK017) was confirmed still active. No mortality signals indicating dead caribou were detected.

The remaining 4 animals were not detected during the monitoring flight. These included 1 SCEK ATS Iridium collar suspected to have failed (SCEK042; Milligan), 1 SCEK ATS Iridium-collared caribou whose satellite function failed in March but whose VHF beacon is heard intermittently (SCEK005; Kiwigana), and 1 previously-deployed MFLNRO VHF collar suspected to have exceeded its battery life (BC1000; Parker). The fourth undetected caribou collar is a SCEK VHF collar (SCEK113) from the Calendar core.

Twenty wolf collar frequencies were scanned during the October 3-4, 2013 monitoring flight, including 14 Iridium collars and 6 VHF collars. Of the 14 Iridium wolf collars, 9 appeared to have normal VHF beacon function; VHF signals from the remaining 5 were not detected. Four of the 5 undetected Iridium wolf collars also appear to have Iridium data function problems, indicating possible collar failure. The remaining undetected Iridium wolf collar (BW010) has current satellite transmission function but has dispersed north of the search area approximately 60 km into the Northwest Territories. Of the 6 VHF wolf collars scanned, 5 had normal VHF signals and 1 could not be located (BW007; Snake Pack).

#### *Discussion*

With the exception of Calendar VHF collar SCEK113, all caribou collars not suspected to have failed were located during the October 3-4, 2013 monitoring flight. Three additional Calendar VHF collars that had remained missing until the September flight were again located at separate sites approximately 25 km north of the NWT border. Two Milligan VHF collars that were not detected during the September flight were located within the search area during the October 3-4 flight.

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

Cordially,



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Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the October 3-4, 2013 SCEK fixed-wing telemetry monitoring flight.

| ID        | Species | Range     | Core     | Collar Type  | Status                | Date     | East   | North   | Comments                         |
|-----------|---------|-----------|----------|--------------|-----------------------|----------|--------|---------|----------------------------------|
| SCEK114   | Caribou | Calendar  | Calendar | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 620293 | 6643237 | normal                           |
| SCEK136   | Caribou | Calendar  | Calendar | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 631639 | 6633784 | normal                           |
| SCEK135   | Caribou | Calendar  | Calendar | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 637848 | 6624085 | normal                           |
| SCEK119   | Caribou | Calendar  | Calendar | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 612375 | 6635958 | normal                           |
| SCEK113   | Caribou | Calendar  | Calendar | Lotek-VHF    |                       | 3-Oct-13 |        |         | not detected                     |
| SCEK123   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 606875 | 6635198 | normal                           |
| SCEK122   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 626756 | 6676061 | normal                           |
| SCEK138   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 631796 | 6623574 | normal                           |
| SCEK137   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 635954 | 6642299 | normal                           |
| SCEK120   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 608604 | 6643204 | normal                           |
| SCEK116   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 632721 | 6680269 | normal                           |
| SCEK134   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 630365 | 6638521 | normal                           |
| SCEK112   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 642754 | 6638935 | normal                           |
| SCEK125   | Caribou | Calendar  | Calendar | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 654252 | 6675754 | normal                           |
| SCEK126   | Caribou | Calendar  | RRA-C    | ATS-irid     | 50 ppm; no double 6th | 3-Oct-13 | 608172 | 6641053 | normal                           |
| SCEK146   | Caribou | Calendar  | RRA-D    | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 609920 | 6638640 | normal                           |
| SCEK147   | Caribou | Calendar  | RRA-D    | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 625865 | 6650575 | normal                           |
| SCEK108   | Caribou | Calendar  | RRA-D    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 628986 | 6631239 | normal                           |
| SCEK107   | Caribou | Calendar  | RRA-D    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 608657 | 6642323 | normal                           |
| SCEK036   | Caribou | Chinchaga | Milligan | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 611946 | 6349533 | normal                           |
| SCEK038   | Caribou | Chinchaga | Milligan | ATS-irid     | 50 ppm; double 6th    | 4-Oct-13 | 678070 | 6302300 | normal                           |
| SCEK026   | Caribou | Chinchaga | Milligan | ATS-irid     | 50 ppm; double 6th    | 4-Oct-13 | 674102 | 6303372 | normal                           |
| SCEK033   | Caribou | Chinchaga | Milligan | ATS-irid     | 50 ppm; no double 6th | 4-Oct-13 | 634603 | 6324789 | normal                           |
| SCEK042   | Caribou | Chinchaga | Milligan | ATS-irid     |                       |          |        |         | not heard; suspected malfunction |
| AB149.391 | Caribou | Chinchaga | Milligan | unknown      | 60 ppm                | 4-Oct-13 | 673178 | 6333003 | normal                           |
| SCEK040   | Caribou | Chinchaga | Milligan | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 639755 | 6418165 | normal                           |
| SCEK034   | Caribou | Chinchaga | Milligan | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 653013 | 6317656 | normal                           |
| SCEK055   | Caribou | Chinchaga | Milligan | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 647100 | 6345950 | normal                           |
| SCEK037   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 672995 | 6302938 | normal                           |
| AB150.470 | Caribou | Chinchaga | Milligan | unknown      | 60 ppm                | 4-Oct-13 | 660469 | 6358780 | normal                           |
| SCEK035   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 634059 | 6326191 | normal                           |
| SCEK041   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 644267 | 6349353 | normal                           |
| SCEK027   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 673655 | 6295832 | normal                           |
| SCEK032   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 632113 | 6330847 | normal                           |
| SCEK029   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 672216 | 6328978 | normal                           |
| SCEK052   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 655304 | 6313998 | normal                           |
| SCEK053   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 631540 | 6331570 | normal                           |
| SCEK030   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 668860 | 6335948 | normal                           |
| SCEK056   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 618087 | 6349797 | normal                           |
| SCEK058   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 604338 | 6445499 | normal                           |
| SCEK054   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 652942 | 6352073 | normal                           |
| SCEK057   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 634937 | 6339227 | normal                           |
| SCEK059   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 613534 | 6346374 | normal                           |
| SCEK061   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 667109 | 6339482 | normal                           |
| SCEK060   | Caribou | Chinchaga | Milligan | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 613602 | 6351168 | normal                           |
| SCEK142   | Caribou | Chinchaga | RRA-A    | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 607543 | 6449387 | normal                           |
| SCEK139   | Caribou | Chinchaga | RRA-A    | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 643813 | 6451584 | normal                           |
| SCEK046   | Caribou | Chinchaga | RRA-A    | ATS-irid     | 50 ppm; double 6th    | 4-Oct-13 | 608010 | 6448311 | normal                           |
| SCEK047   | Caribou | Chinchaga | RRA-A    | ATS-irid     | 50 ppm; double 6th    | 4-Oct-13 | 598884 | 6452608 | normal                           |

Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the October 3-4, 2013 SCEK fixed-wing telemetry monitoring flight cont.

| ID      | Species | Range          | Core        | Collar Type  | Status                | Date     | East   | North   | Comments                         |
|---------|---------|----------------|-------------|--------------|-----------------------|----------|--------|---------|----------------------------------|
| SCEK048 | Caribou | Chinchaga      | RRA-A       | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 587847 | 6413495 | normal                           |
| SCEK141 | Caribou | Chinchaga      | RRA-A       | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 606246 | 6441596 | normal                           |
| SCEK009 | Caribou | Fort Nelson    | Fort Nelson | ATS-irid     | 50 ppm; no double 6th | 3-Oct-13 | 514687 | 6534995 | normal                           |
| BC1014  | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 474202 | 6580193 | normal                           |
| BC1015  | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 466845 | 6573888 | normal                           |
| SCEK002 | Caribou | Max hamish     | Capot-Blanc | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 478693 | 6581384 | normal                           |
| SCEK007 | Caribou | Max hamish     | Capot-Blanc | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 454948 | 6580024 | normal                           |
| SCEK001 | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 471171 | 6581051 | normal                           |
| SCEK076 | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 457074 | 6579270 | normal                           |
| SCEK066 | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 471135 | 6575832 | normal                           |
| SCEK067 | Caribou | Max hamish     | Capot-Blanc | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 442547 | 6571355 | normal                           |
| BC1033  | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 511714 | 6616794 | normal                           |
| BC1024  | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 537069 | 6640242 | normal                           |
| SCEK085 | Caribou | Max hamish     | Fortune     | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 527014 | 6635618 | normal                           |
| SCEK163 | Caribou | Max hamish     | Fortune     | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 483508 | 6625769 | normal                           |
| SCEK130 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 536308 | 6633947 | normal                           |
| SCEK164 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 546374 | 6624000 | normal                           |
| SCEK078 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 464631 | 6627502 | normal                           |
| SCEK128 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 534591 | 6637669 | normal                           |
| SCEK086 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 531609 | 6632856 | normal                           |
| SCEK129 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 540095 | 6632074 | normal                           |
| SCEK087 | Caribou | Max hamish     | Fortune     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 549040 | 6627686 | normal                           |
| SCEK003 | Caribou | Max hamish     | Kiwigana    | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 523585 | 6570060 | normal                           |
| BC1066  | Caribou | Max hamish     | Kiwigana    | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 534109 | 6561445 | normal; MFLNRO 2012 deployment   |
| SCEK063 | Caribou | Max hamish     | Kiwigana    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 536753 | 6563026 | normal                           |
| SCEK064 | Caribou | Max hamish     | Kiwigana    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 536329 | 6565736 | normal                           |
| SCEK004 | Caribou | Max hamish     | Kiwigana    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 507217 | 6596390 | normal                           |
| BC1009  | Caribou | Max hamish     | Kiwigana    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 519694 | 6567558 | normal; old wolf collar          |
| SCEK005 | Caribou | Max hamish     | Kiwigana-OS | ATS-irid     |                       |          |        |         | not heard; suspected malfunction |
| SCEK062 | Caribou | Max hamish     | Kiwigana-OS | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 527951 | 6569089 | normal                           |
| SCEK006 | Caribou | Max hamish     | Kiwigana-OS | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 503616 | 6591860 | normal                           |
| SCEK016 | Caribou | Parker         | Parker      | ATS-irid     | 50 ppm; no double 6th | 3-Oct-13 | 478436 | 6516317 | normal                           |
| SCEK014 | Caribou | Parker         | Parker      | ATS-irid     | 50 ppm; no double 6th | 3-Oct-13 | 482128 | 6514015 | normal                           |
| SCEK013 | Caribou | Parker         | Parker      | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 489945 | 6512448 | normal                           |
| SCEK010 | Caribou | Parker         | Parker      | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 488534 | 6502200 | normal                           |
| SCEK012 | Caribou | Parker         | Parker      | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 486912 | 6513209 | normal                           |
| SCEK015 | Caribou | Parker         | Parker      | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 489278 | 6523706 | normal                           |
| BC1000  | Caribou | Parker         | Parker      | Lotek-VHF    |                       |          |        |         | old VHF; not detected            |
| BC1001  | Caribou | Parker         | Parker      | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 488727 | 6514034 | normal                           |
| SCEK161 | Caribou | Prophet        | Prophet-OS  | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 574540 | 6450402 | normal                           |
| SCEK050 | Caribou | Prophet        | Prophet-OS  | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 559313 | 6446044 | normal                           |
| SCEK051 | Caribou | Prophet        | Prophet-OS  | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 552851 | 6464619 | normal                           |
| SCEK049 | Caribou | Prophet        | Prophet-OS  | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 550676 | 6451188 | normal                           |
| SCEK045 | Caribou | Prophet        | Prophet-OS  | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 570581 | 6442871 | normal                           |
| SCEK044 | Caribou | Prophet        | RRA-B       | ATS-irid     | 50 ppm; double 6th    | 3-Oct-13 | 571054 | 6456053 | normal                           |
| SCEK143 | Caribou | Prophet        | RRA-B       | Vectr-Vertex | 50 ppm                | 3-Oct-13 | 534135 | 6481813 | normal                           |
| SCEK144 | Caribou | Prophet        | RRA-B       | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 575220 | 6450843 | normal                           |
| SCEK043 | Caribou | Prophet        | RRA-B       | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 565404 | 6451767 | normal                           |
| SCEK020 | Caribou | Snake-Sahtaneh | Clarke      | ATS-irid     | 50 ppm; no double 6th | 3-Oct-13 | 558585 | 6471533 | normal                           |

Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the October 3-4, 2013 SCEK fixed-wing telemetry monitoring flight cont.

| ID      | Species | Range          | Core            | Collar Type  | Status                | Date     | East   | North   | Comments                             |
|---------|---------|----------------|-----------------|--------------|-----------------------|----------|--------|---------|--------------------------------------|
| SCEK017 | Caribou | Snake-Sahtaneh | Clarke          | ATS-Irid     | 30 ppm; double 2nd    | 4-Oct-13 | 538907 | 6501473 | false mortality; still moving        |
| SCEK068 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 561154 | 6535968 | normal                               |
| SCEK150 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 599658 | 6488570 | normal                               |
| SCEK148 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 602529 | 6487068 | normal                               |
| SCEK153 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 537099 | 6501246 | normal                               |
| SCEK151 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 567420 | 6497680 | normal                               |
| SCEK152 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 569611 | 6500523 | normal                               |
| SCEK019 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 572581 | 6505793 | normal                               |
| SCEK021 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 566244 | 6499231 | normal                               |
| SCEK025 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 588819 | 6478099 | normal                               |
| SCEK024 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 563686 | 6531705 | normal                               |
| SCEK018 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 533168 | 6499588 | normal                               |
| SCEK154 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 565522 | 6497474 | normal                               |
| SCEK149 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 568153 | 6503741 | normal                               |
| SCEK156 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 542214 | 6502687 | normal                               |
| SCEK157 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 561933 | 6498184 | normal                               |
| SCEK070 | Caribou | Snake-Sahtaneh | Clarke          | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 566762 | 6504163 | normal                               |
| SCEK145 | Caribou | Snake-Sahtaneh | Clarke-OS       | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 593899 | 6547289 | normal                               |
| SCEK100 | Caribou | Snake-Sahtaneh | East Kotcho     | ATS-Irid     | 50 ppm; double 6th    | 4-Oct-13 | 632357 | 6546038 | normal                               |
| SCEK104 | Caribou | Snake-Sahtaneh | East Kotcho     | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 609089 | 6570811 | normal                               |
| SCEK103 | Caribou | Snake-Sahtaneh | East Kotcho     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 631164 | 6558268 | normal                               |
| SCEK102 | Caribou | Snake-Sahtaneh | East Kotcho     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 627601 | 6552711 | normal                               |
| SCEK105 | Caribou | Snake-Sahtaneh | East Kotcho     | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 629257 | 6549417 | normal                               |
| SCEK111 | Caribou | Snake-Sahtaneh | North Kotcho    | Vectr-Vertex | 50 ppm                | 4-Oct-13 | 606651 | 6573524 | normal                               |
| SCEK074 | Caribou | Snake-Sahtaneh | North Kotcho    | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 615768 | 6571741 | normal                               |
| SCEK089 | Caribou | Snake-Sahtaneh | North Kotcho    | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 610613 | 6576087 | normal                               |
| SCEK088 | Caribou | Snake-Sahtaneh | North Kotcho    | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 632468 | 6559891 | normal                               |
| SCEK090 | Caribou | Snake-Sahtaneh | North Kotcho    | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 622046 | 6578207 | normal                               |
| SCEK092 | Caribou | Snake-Sahtaneh | North Kotcho    | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 614752 | 6581492 | normal                               |
| BC1037  | Caribou | Snake-Sahtaneh | North Kotcho-OS | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 594061 | 6551065 | normal                               |
| SCEK110 | Caribou | Snake-Sahtaneh | North Kotcho-OS | ATS-Irid     | 50 ppm; double 6th    | 4-Oct-13 | 612412 | 6569824 | normal                               |
| SCEK096 | Caribou | Snake-Sahtaneh | Paradise        | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 562615 | 6533397 | normal                               |
| SCEK079 | Caribou | Snake-Sahtaneh | Tsea            | ATS-Irid     | 50 ppm; no double 6th | 3-Oct-13 | 552054 | 6595693 | normal                               |
| SCEK131 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 553893 | 6594933 | normal                               |
| SCEK081 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 561609 | 6598029 | normal                               |
| SCEK083 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 560585 | 6598057 | normal                               |
| SCEK132 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 554679 | 6590443 | normal                               |
| SCEK082 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 555607 | 6591993 | normal                               |
| SCEK127 | Caribou | Snake-Sahtaneh | Tsea            | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 555712 | 6596361 | normal                               |
| SCEK071 | Caribou | Snake-Sahtaneh | West Kotcho     | Vectr-Vertex | 50 ppm; double 6th    | 4-Oct-13 | 591249 | 6547518 | normal                               |
| SCEK091 | Caribou | Snake-Sahtaneh | West Kotcho     | ATS-Irid     | 50 ppm                | 4-Oct-13 | 610103 | 6571313 | normal                               |
| SCEK091 | Caribou | Snake-Sahtaneh | West Kotcho     | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 609672 | 6574286 | normal                               |
| SCEK073 | Caribou | Snake-Sahtaneh | West Kotcho     | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 593995 | 6547384 | normal                               |
| SCEK094 | Caribou | Snake-Sahtaneh | West Kotcho-OS  | Lotek-VHF    | 60 ppm                | 4-Oct-13 | 590852 | 6549005 | normal                               |
| BW002   | Wolf    | Chinchaga      | Big Arrow       | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 628360 | 6339193 | normal                               |
| BW011   | Wolf    | Chinchaga      | Big Arrow       | Lotek-Irid   | 50 ppm                | 3-Oct-13 | 628360 | 6339193 | normal VHF; no Iridium data function |
| BW008   | Wolf    | Fort Nelson    | Tsimeh          | Lotek-Irid   | 50 ppm                | 3-Oct-13 | 504320 | 6558319 | no VHF; no data since Jun 30         |
| BW001   | Wolf    | Fort Nelson    | Tsimeh          | Lotek-VHF    | 60 ppm                | 3-Oct-13 | 504320 | 6558319 | normal                               |

Table 1. VHF signal status and location of boreal caribou and wolf collars detected during the October 3-4, 2013 SCEK fixed-wing telemetry monitoring flight cont.

| ID    | Species | Range          | Core        | Collar Type | Status | Date     | East   | North   | Comments                            |
|-------|---------|----------------|-------------|-------------|--------|----------|--------|---------|-------------------------------------|
| BW009 | Wolf    | Fort Nelson    | Tsimeh      | Lotek-Irid  | 50 ppm | 3-Oct-13 | 504320 | 6558319 | normal                              |
| BW014 | Wolf    | Fort Nelson    | Tsimeh      | Lotek-Irid  | 50 ppm | 3-Oct-13 | 504320 | 6558319 | normal                              |
| BW020 | Wolf    | Parker         | Parker      | Lotek-VHF   | 60 ppm | 3-Oct-13 | 499109 | 6509226 | normal                              |
| BW019 | Wolf    | Parker         | Parker      | Lotek-Irid  | 50 ppm | 3-Oct-13 | 499109 | 6509226 | normal                              |
| BW021 | Wolf    | Snake-Sahtaneh | Clarke      | Lotek-Irid  |        |          |        |         | not detected; no data since Jun 30  |
| BW022 | Wolf    | Snake-Sahtaneh | Clarke      | Lotek-VHF   | 60 ppm | 4-Oct-13 | 563545 | 6509000 | normal                              |
| BW018 | Wolf    | Snake-Sahtaneh | Elleh       | Lotek-Irid  | 50 ppm | 4-Oct-13 | 576711 | 6490087 | normal                              |
| BW017 | Wolf    | Snake-Sahtaneh | Elleh       | Lotek-Irid  | 50 ppm | 4-Oct-13 | 576711 | 6490087 | normal                              |
| BW023 | Wolf    | Snake-Sahtaneh | Snake       | Lotek-VHF   | 60 ppm | 4-Oct-13 | 560839 | 6541677 | normal                              |
| BW015 | Wolf    | Snake-Sahtaneh | Snake       | Lotek-Irid  | 50 ppm | 4-Oct-13 | 560839 | 6541677 | VHF weak; Iridium function normal   |
| BW007 | Wolf    | Snake-Sahtaneh | Snake       | Lotek-VHF   |        |          |        |         | not detected                        |
| BW016 | Wolf    | Snake-Sahtaneh | Snake       | Lotek-Irid  |        |          |        |         | not heard; no data since Aug 15     |
| BW010 | Wolf    | Snake-Sahtaneh | Snake       | Lotek-Irid  |        |          |        |         | dispersal to NWT; Irid data current |
| BW013 | Wolf    | Snake-Sahtaneh | West Clarke | Lotek-Irid  | 60 ppm | 3-Oct-13 | 519120 | 6506502 | VHF norm; no data since Jun 30      |
| BW003 | Wolf    | Snake-Sahtaneh | West Clarke | Lotek-Irid  |        |          |        |         | not heard; suspected malfunction    |

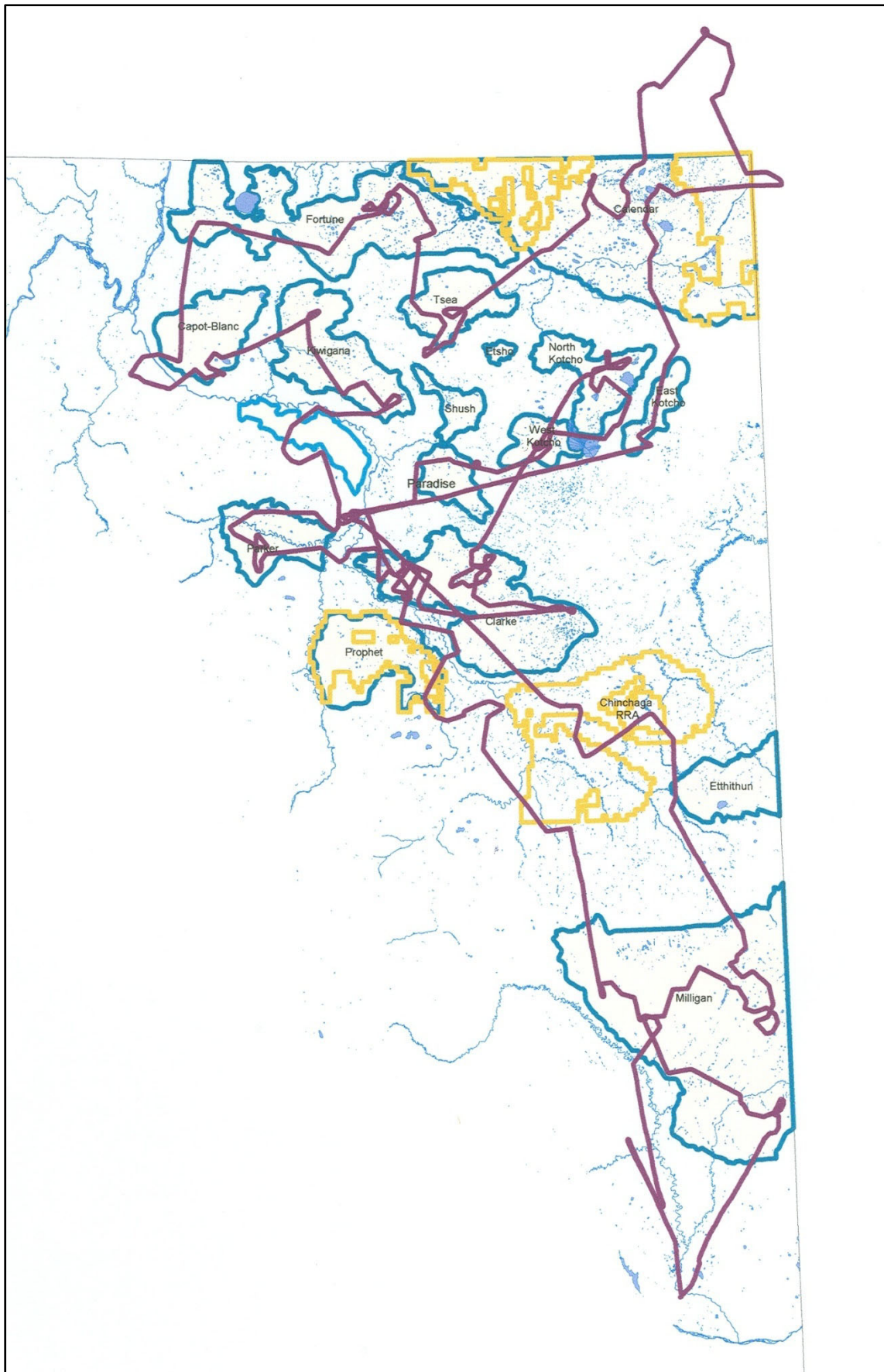


Figure 1. Flight paths flown during the October 3-4, 2013 SCEK fixed-wing boreal caribou and wolf telemetry monitoring flight.