

Boreal Caribou Population Trend Monitoring in the Cameron Hills Area of the Deh Cho – Community Involvement

Final Project Report

The Department of Resources, Wildlife and Economic Development (RWED) received funding from the NWT Cumulative Impact Monitoring Program to support community involvement in monitoring boreal caribou population trends in the Cameron Hills area of the Deh Cho. The population parameter monitoring was conducted from January 25th – March 31st, 2004.

The aim of this pilot project was to promote community knowledge and participation in monitoring boreal caribou population trends in the Cameron Hills area of the Deh Cho.

Summary of Activities

Telemetry Flights

- Boreal caribou were relocated on January 25th and February 13th, 2004. As only funds were available for community participation during the March fieldwork, the above flights were not conducted with community involvement. During the January and February flights, all collared boreal caribou were located.
- A telemetry flight was conducted on March 12th, 2004 to locate groups of boreal caribou associated with the collared cows for the deployment of further collars later in March.

Deployment of Radio Collars

- The deployment of radio collars was planned to begin on March 1, 2004. However, due to a mechanical delay with the capture helicopter, the start date was delayed until March 11th, 2004. Consequently, reconnaissance flights to locate boreal caribou for the collar deployment were initiated on March 8th, 2004.
- A community member from Kakisa was hired on a contract basis to participate in the reconnaissance flights as an observer. Three reconnaissance flights were conducted from March 8 – 12th, 2004.
- The capture helicopter, however, was not repaired by March 11th, 2004 and by the time it was ready to conduct the capture work, one of the crew members had prior commitments to fulfil. Consequently, the capture crew did not arrive in Hay River until the evening of March 25th, 2004.
- The weather forecast for the end of March was not predicting good weather; therefore, the community member from Kakisa was not initially called when the capture crew arrived to ensure that the community member did not have to wait in Hay River for bad weather to clear. The community member had

had to wait in Hay River for several days during the initial reconnaissance flights in the middle of March for delays due to bad weather and logistics of the capture crew. Therefore, to prevent unnecessary waiting, it was decided to not call in the community monitor unless it was certain that we could fly. As we were approaching the weekend when the capture crew arrived in Hay River, the community observer was told to wait until the following Monday until coming to Hay River.

- However, the weather unexpectedly cleared, and therefore, the reconnaissance plane was deployed to locate caribou for the capture crew without participation from the community observer. Moreover, the capture crew were more proficient and efficient in their work than expected, and therefore, all the collars were deployed in three days (March 26th – March 28th) rather than the projected 7 days, as planned. As a result, the community observer did not participate in the deployment of collars.

Calf Recruitment Counts

- Calf recruitment counts were not conducted until April 2004, due to the delayed arrival of the capture crew until March 25th, 2004. Furthermore, I had to deploy other collars in the Trout Lake area and did not finish that work until April 1st, 2004.
- Calf recruitment counts were conducted on April 7th and 8th, 2004. A fixed wing plane was used to locate the collared caribou and guide a helicopter to the collared caribou. Once the group associated with the collared cow was spotted from the helicopter, the crew in the helicopter classified each animal as either an adult female, adult male or calf based on size for calves and presence of black vulva patch for females or lack thereof for males.

Results of Activities

Telemetry Flights

- All 13 collared caribou cows were located on telemetry flights on January 25th, February 13th and March 12th, 2004; figure 1 shows their locations in the study area for each identified time period. No adult female mortality events occurred from January 1 – March 31, 2004.
- Seventeen VHF radio collars were deployed on boreal caribou adult females in March 2003. Four cow mortality events occurred from March 2003 – 2004; one each in the months of May, July, August and September, respectively. All mortality events were attributed to predation by both wolves and black bears.
- The annual rate of cow survival (March 03 – 15 February 2004) was 0.7647 ± 0.1029 SE (n=17) based on Pollock's et al.'s (1989) staggered-entry modification of Kaplan and Meier's (1958) survivorship model to estimate adult annual survival. All collars were located on telemetry flights and no collars were lost to malfunctions or animals leaving the study area.

Deployment of Radio Collars

- A further 21 radio VHF collars were deployed from March 26-28, 2004 increasing the sample size to 34 collared cows; figure 2 presents the location of the newly deployed collars in relation to the existing collars.

Recruitment Counts

- Thirty-three (33) caribou groups were classified during the recruitment counts. A total of 127 adult females, 70 adult males and 23 calves were observed (221 individual caribou). Figure 3 shows the location of collared cows during the recruitment counts.
- Calf recruitment expressed as the ratio of calves of 10 months of age per 100 adult females was 0.1717 ± 0.0293 SE (n=33) based on Tukey's jackknife method (Krebs 1999).
- The finite rate of increase was estimated from the annual recruitment of female calves (assuming a 50:50 sex ratio in calf production and equal survival of sexes to time of census) and annual female mortality based on the formula outlined by Hatter and Bergerud (1991). For March 2003-2004, the annual rate of increase for the population was 0.8365 (95% CI = 0.6119-1.0757) based on 17 collared adult females.

Discussion – Success of the Community Involvement

Adult female survival rate for the study area is low, but due to the small sample size there is much uncertainty regarding this value (high variance). The estimated cow survival rate is similar to values observed in Alberta, where extensive monitoring of population trends has occurred. For boreal caribou ranges in northeastern Alberta, mean annual adult survival rates of radio-collared females averaged 0.88 and varied from 0.86-0.93 (McLoughlin et al. 2003). In Saskatchewan, mortality of adult females was 14% (Rettie and Messier 1998).

Four adult cow mortality events occurred from late spring to late summer, with one event in each of the months of May, July, August and September. Two of four mortality events were attributed to wolf predation and the other two to unknown predators; although there was no conclusive evidence, black bears may have been responsible for these other two deaths. Predation, primarily by wolves, had been identified as the most common cause of death for adult female boreal caribou. Predation appears to be responsible for at least 50-75% of mortalities (Morton and Wynes 1997, Rettie and Messier 1998, Stuart-Smith et al 1997). Other predators include black bear (*Ursus americanus*), coyote (*Canis latrans*) and Canada lynx (*Lynx canadensis*). Other documented mortality factors include hunting, poaching and natural causes such as physical injury or poor body condition. The frequency of adult female mortality tends to show a seasonal bias with more mortalities occurring between April and October (McLoughlin et al. 2003, Rettie and Messier 1998).

Juvenile survival of boreal caribou shows strong variation between areas and both within and between years. Survival of calves can vary from almost none to 100%, depending on abundance of predators and forage accessibility during pregnancy and the first year of life. Calf survival to 10 months of age for the study area is low, but comparable to results from northern Alberta. Over various boreal caribou ranges in central and northern Alberta, calf recruitment (estimates of calf survival to 10 months of age) averaged near or below 20 calves:100 cows from 1993 to 2002 (mean = 17.1, range = 11.4-22.7). During the first year of life, calf survival appears to follow a negative exponential curve, with calf mortality greatest during the first 4-6 weeks after birth (Stuart-Smith et al. 1997, Rettie and Messier 1998). In northeastern BC, a neonatal survey in the end of June, October and March found 20 calves, 13 calves and 6 calves per 100 cows, respectively (Slocan 2003). In central Saskatchewan, calf recruitment averaged 28 calves per 100 cows during the mid 1990s (Rennie and Messier 1998).

Accurate and precise population estimates are exceedingly difficult to obtain for boreal caribou. The development of reliable survey techniques for boreal caribou have been complicated by the difficulty in sighting them due to factors such as caribou exist at low densities, their habit to remain close to coniferous habitats in winter and their cryptic pelage. As there has been no progress in developing a reliable survey technique for boreal caribou, indices of caribou population dynamics have been used to monitor population trends based on adult cow and calf survival rates, most significantly in Alberta (Dzus 2001). McLoughlin et al. (2003) summarised the population dynamics in 6 boreal caribou ranges in Alberta from 1993-2002. Based on monitoring population finite rate of increase, boreal caribou populations on four ranges exhibited declines, while populations on the other two ranges were stable during the study period. The annual rate of increase for the study area was based on a small sample size, and therefore, there is much uncertainty regarding the status of the population in the study area. Deployment of 21 collars in March 2004 will help reduce the variation in adult cow survival rates, calf recruitment rates and annual rate of increase, allowing comparisons in population trends.

Monthly telemetry flights during January to March 2004 will contribute to calculation of annual home ranges and coarse winter habitat use. The average annual home range calculated using 100% minimum complex polygon was 619 km² and ranged from 75 km² to 1235 km². Based on the 95% fixed kernel estimate, the mean annual home range value was 1234 km² and ranged from 161 km² to 4285 km². Habitat use and selection analysis is still pending.

Community involvement in population trend monitoring, especially winter fieldwork is difficult for this project for several reasons. Observers from Kakisa need to be located in Hay River, as there is no landing strip at the community and landing on Kakisa Lake is unpredictable. Consequently, due to bad weather and unforeseen circumstances, the community observer may spend quite a few days waiting around, which not only leads to frustration but also means that

funds to allow community participation end up covering stand-by costs, which limits the amount of time a community observer may be used. Unfortunately, for the 2004 winter population monitoring work, there were numerous delays due to both weather and unforeseen circumstances with the capture crew. As a result, community involvement was limited and many of the funds were used to cover stand-by costs. However, in the end, the community observer did gain an understanding of the difficulty associated with organising and carrying out winter fieldwork associated with monitoring boreal caribou population trends. Lastly, boreal caribou research in the NWT is in its infancy, and therefore, there is still much uncertainty regarding its conduct, which makes it doubly difficult to incorporate community involvement.

Recommendations for Monitoring Population Trends and Future Community Involvement

Based upon the experiences gained through year one of this project, the following recommendation are presented:

- Ensure that sample size is maintained above 30 collared cows.
- Examine alternatives methods to promoting community understanding of population trend monitoring such as poster, community meetings, video products, etc.

Overall the project was successful in monitoring boreal caribou population trends. The major limitation in analysis of the data was the small sample size for the first year of the study. Fortunately, all the radio VHF collars were deployed in March 2004, which will allow adult cow survival and calf recruitment rates and the annual rate of population increase to be measured with greater precision, allowing trends to be estimated. However, due to basing the fieldwork out of Hay River, it is difficult to involve community members from Kakisa unless considerable funds are allocated to cover stand-by costs associated with bad weather and unforeseen circumstances.

Figure 1: Location of 13 collared boreal caribou cows on January 25 (blue), February 13 (pink) and March 12th (green). Individual collared cows are listed by their collar identification number.

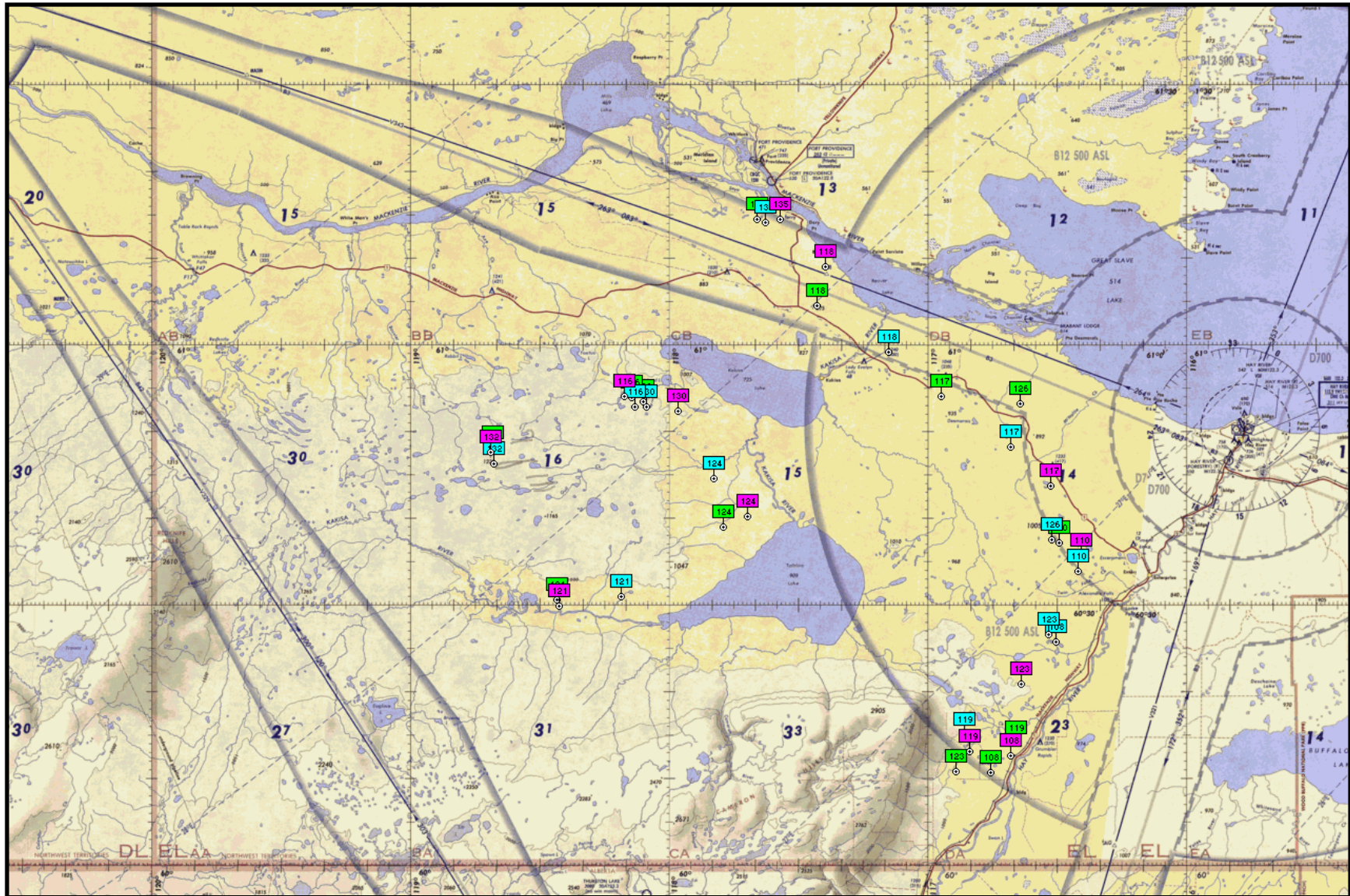


Figure 2: Location of 21 collared boreal caribou cows (blue) deployed in March 2004 in relation to 13 existing collared cows (green) deployed in March 2003. Individual collared cows are listed by their collar identification number.

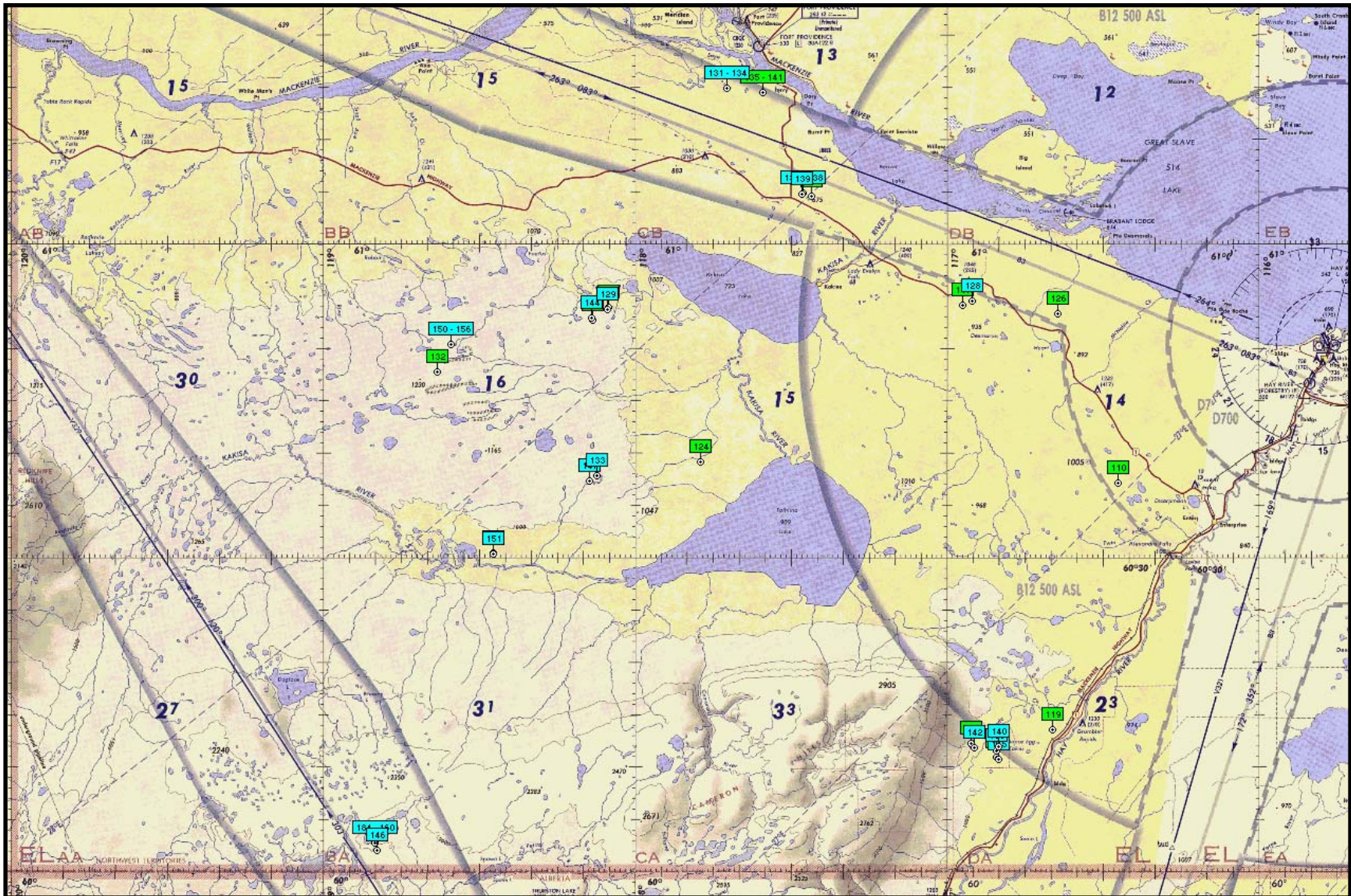
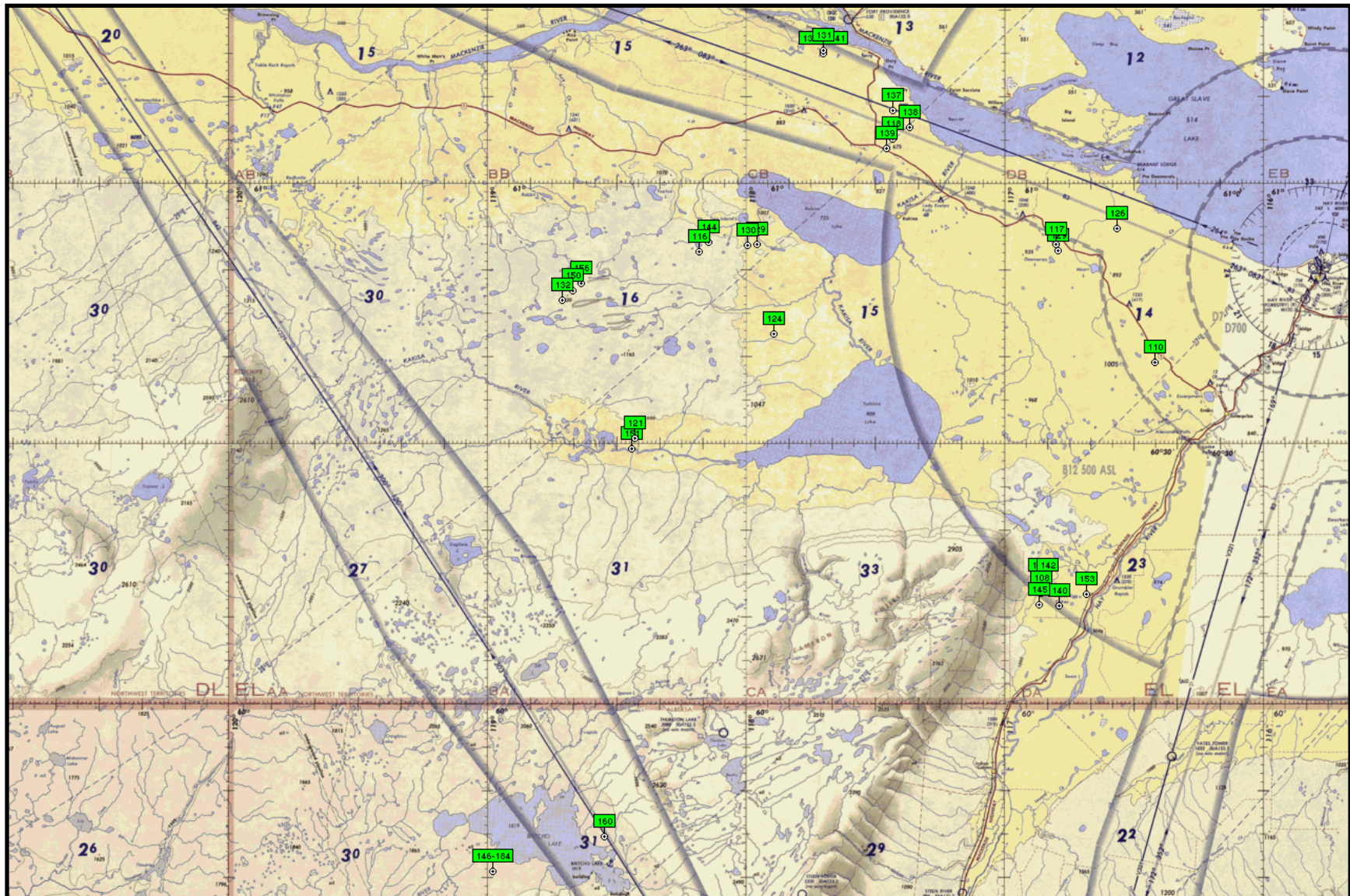


Figure 3: Location of collared boreal caribou cows during the calf recruitment counts (April 7-8, 2004). Individual collared cows are listed by their collar identification number.



Financial Expenditures

Expenses	Expenditure	Supplier	Comment
Telemetry Flights (Jan and Feb)	\$ 5,734.40	Big River Air	March telemetry flight covered by Biophysical funding
Community Participation contract	\$ 5,000.00	Ka'a'gee Tu First Nation	
Calf Recruitment - fixed wing	\$ 5,636.00	Landa Aviation	
Calf Recruitment - helicopter	\$ 9,971.06	Great Slave Helicopters	
TOTAL	\$ 26,341.46		Amount over \$25 000.00 covered by RWED South Slave Region

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