SUMMARY

The trans-border region encompassing the watershed of the legendary South Nahanni River in the Northwest Territories and adjacent areas in southeast Yukon Territory comprises some of the last, large wildlands in North America. Across these boreal forests and mountains roams one of the most iconic but vulnerable wildlife species of Canada: the woodland caribou (*Rangifer tarandus caribou*). In this context, a chronicle of caribou travels in a relatively pristine landscape can provide a valuable basis and benchmark for conservation. Accordingly, I analyzed 3493 satellite (PTT) locations of 24 adult female caribou obtained during 2000-2007 to discern their seasonal ranges and migration routes.

I distinguished 2 local populations - the 'Coal River' and 'La Biche' groups - based on spatial separation during multiple seasons. Coal River caribou occupied an annual range (100% MCP) of 29,815 km^2 with 44% on the Nahanni side and 56% on the Yukon side; La Biche caribou ranged across 9,568 km^2 with 68% on the Nahanni side and 32% on the Yukon side.

Both caribou groups spent late winter (Feb 1 – Apr 15) in montane spruce forests (with lichen understorey) along the lower South Nahanni River inside Nahanni National Park Reserve. In spring, caribou migrated west and south along major river valleys and across the Territorial border to mountain plateaus in southeast Yukon. From the beginning of calving in late May until the end of the rut or breeding period in mid-October, members of the Coal River group were spread out across 15,000 km^2 of alpine plateaus and subalpine basins in the Coal River and Hyland River watersheds in southeast Yukon. After the rut, they moved eastward back into the Nahanni country through a section along the Territorial divide known as Caribou Pass. Later in fall, Coal River caribou wandered around a large expanse of boreal forest in the Caribou and Meilleur River basins. As snowfall typically increased in early winter, these caribou moved further north toward and into Nahanni National Park Reserve to complete their yearly round of travels.

Caribou of the La Biche group confined their range during the calving, summer, and rut periods to 2,000 km^2 of mountain plateaus in the upper basins of the La Biche and Whitefish Rivers in southeast Yukon (close to the Territory border). In years of heavier snowfall, they also moved northward by late winter toward and into Nahanni National Park Reserve.

Overall, these caribou exhibited a remarkable degree of *fidelity* (return to within 10 km of previous centre of activity) to calving (86% of individuals/ 78% of cases) and summer (July) sites (81%/ 70%) and lesser fidelity to rut (56%/ 48%) and late-winter (March) sites (53%/ 40%). This pattern of strong fidelity to calving and summer sites, moderate fidelity to rut sites, and weaker fidelity to winter ranges appears consistent across many studies of woodland caribou in mountainous landscapes of western Canada and some caribou studies in boreal forests of eastern Canada.

Caribou in each group migrated along several specific routes to which they exhibited varying degrees of fidelity, depending upon the season. During spring migration, 12 (80%) of 15 individuals used the same entire route in 2 or more years; for 35 cases, they followed the entire route (54%) or at least a certain segment (26%). In the return migration during fall and early winter, however, only 5 (36%) of 14 individuals used the same entire route in 2 or more years; for 34 cases, they followed the entire route (24%) or at least a certain section (41%).

Woodland caribou typically are relatively sedentary; by contrast, these trans-border groups of woodland caribou traveled exceptional distances during migration. In spring, members of the Coal River group moved with strong directionality an average distance of 168 km (longest 253 km) at a rate of 4.7 km/day. La Biche caribou migrated a shorter average distance of 95 km (longest 121 km) at a rate of 3.7 km/day. In fall, Coal River caribou moved (with variable directionality) an average distance of 221 km (longest 327 km). Again, members of the La Biche group migrated a shorter distance of 95 km (longest 121 km). In the Nahanni trans-border region, alpine habitats on the Nahanni side are few, isolated, and narrow. Thus, the broad-scale pattern of the landscape suggests that caribou migrate in spring to distant alpine sites in the Yukon to position themselves for the calving and post-calving periods; in winters with deep snow, they migrate all the way back to low-elevation forests in the South Nahanni River valley. In terms of round-trip distances, Coal River caribou traveled an average of 392 km (longest 551 km); La Biche caribou moved an average of 178 km (longest 211 km). The only reported migrations that match or exceed distances traveled by the Coal River animals are those of caribou in northern Alaska and Canada and a few populations of antelope species in grasslands of Africa, Mongolia, and Wyoming (USA).

Due to their exceptional travels and remarkable fidelity to seasonal ranges and migration routes, caribou in this intact Nahanni trans-border region represent a unique biological asset. Yet caribou are vulnerable to various impacts from human developments and activities. Hence, large intact landscapes where caribou can move widely to select seasonal ranges and minimize contact with predators appear crucial for their long-term persistence.

Therefore, I propose a trans-border conservation area to maintain the integrity of this intact landscape for caribou. Nahanni National Park Reserve is too small and too narrow to provide for wide-ranging caribou. Scientific findings from this study substantiate Parks Canada's final recommendation for new boundaries that would protect the range of these caribou groups within the South Nahanni River watershed in Dehcho territory. On the Yukon side, land-use plans can incorporate these findings to safeguard important summer ranges (calving and post-calving) and migration routes. Successful conservation of trans-border landscapes for these caribou will require a high level of inter-jurisdictional collaboration and commitment.