

**Migratory tundra caribou seasonal and annual distribution relative to Thaidene Nene,
a national park reserve proposal in the East Arm of Great Slave Lake and Artillery Lake area,
Northwest Territories**

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EXECUTIVE SUMMARY

Migratory tundra caribou (*Rangifer tarandus groenlandicus*) from 3 herds seasonally use the area around the East Arm of Great Slave Lake and Artillery Lake, Northwest Territories. Initially proposed in 1970, work is continuing on developing a national park reserve in this area. To aid this effort we conducted spatial analyses of caribou movements and distribution in this proposed reserve (called Thaidene Nene) to examine how well the withdrawal area captures fall and pre-calving caribou migratory routes and winter habitat use. Analyses were based on satellite-collared cows from the Bathurst and Ahiak herds, and on the literature for the Beverly herd. Collar data may under-estimate the caribou's use of Thaidene Nene as bulls often winter further south than cows and sub-adults.

Some Bathurst caribou have wintered at least in part in Thaidene Nene in 9 of the past 14 winters, although in only 1 of the past 4 years after 2005-06. When present, about 52% of collared Bathurst caribou cows used Thaidene Nene at some time during the winter. In contrast, part of the Ahiak herd has wintered within Thaidene Nene for 8 of the past 9 years, including every winter since 2004-05. When present, approximately 66% of collared Ahiak cows used Thaidene Nene. Since 1996, the Bathurst herd has overall used approximately 82% of Thaidene Nene, concentrated in the south-western portion of the area. The Ahiak herd utilized all of Thaidene Nene at some part of the past 9 years, with greater concentration of wintering in the north-eastern two-thirds. The proportion of the annual winter range of the Bathurst herd that occurred within Thaidene Nene varied from 0-72% (\bar{x} = 12%), and for the Ahiak herd from 3-31% (\bar{x} = 15%). When caribou from either herd wintered within Thaidene Nene, they were present for roughly 4–5 months, from December to April.

Most crossings of the withdrawal boundary by Bathurst animals occurred north and southeast of Reliance, with the greatest concentration of boundary crossing north of Reliance over a 30 km stretch on both sides of treeline. The highest density of individual caribou migration pathways paralleled the treeline lying 20–30 km outside Thaidene Nene's north-western boundary north of McLeod Bay. Most Ahiak caribou crossed the northern and eastern portions of the boundary. Thaidene Nene included a larger proportion of the Ahiak herd's migration corridors - the eastern half of Thaidene Nene was within moderate to high density migratory pathways. Movements of the Ahiak herd showed greater overlap (correlation year-to-year) compared with the Bathurst herd.

During migration and winter areas of burns and lakes were avoided. Selection for terrain ruggedness during winter differed between herds, with Bathurst caribou showing greater selection for more rugged terrain, while Ahiak caribou showed equally strong avoidance. Habitat selection during migration was more muted than during winter. Both herds made high use (but not selection) of hillsides during migration. Selection for rugged terrain was greater for Bathurst caribou during migration, and was positive for Ahiak caribou during migration, a reversal from avoidance during winter movement.

The distribution of the Beverly herd was mapped in the 1980s. Caribou tended to move into Thaidene Nene from the south and southeast in early winter. Their pre-calving migration routes included the Snowdrift River valley. The Beverly Herd declined between 1994 and 2007 and too few cows were fitted with satellite-collars to support analyses of their distribution relative to Thaidene Nene.

Thaidene Nene appears to largely capture fall and pre-calving movements and winter use of Ahiak caribou. Recent use of Thaidene Nene by Bathurst caribou has been lower as the herd has declined sharply in size. As herds decline, the southern boundary of their winter range contracts northward. This suggests that as

Caribou distribution near Thaidene Nene

the Bathurst herd recovers, increased use of Thaidene Nene is likely. Parks Canada may wish to consider changes to the boundary of Thaidene Nene to better capture medium to high-density caribou migratory pathways. Further habitat selection analyses should be explored, and incorporation of Traditional Knowledge of historic caribou movement and hunting areas should also be considered to complement our science-based approach.

