Barren-ground Caribou Seasonal Range Analysis

The seasonal range maps developed for this initiative focus on the mainland migratory and tundra wintering barren-ground caribou herds of the NWT and Nunavut (Figure 5.17). The maps developed represent a synthesis of over two decades of telemetry studies and the most recent and sophisticated spatial analytical methods available, all combined to provide the most precise spatial representation of caribou seasonal range use to date. The purpose of this research is to provide an advanced level of spatial information and certainty to jurisdictions, their community based co-management partners, and the proponents of land use. This information will advise as to where anthropogenic activities will negatively affect our ability to sustain abundant, healthy caribou populations. Knowing where the caribou are throughout the year is essential to:

1. Mitigating seasonal land-use activities and/or regulating industrial development either permanently or seasonally within areas known to be annually and/or seasonally important to barren-ground caribou.
2. Regulate harvesting activities, which are herd specific, during periods of decline, or regulate the activities to prevent local depletion.
3. Monitor spatial changes and/or affiliations between herds through time to ensure up to date information is made available to all wildlife managers.
4. Keeping demographic monitoring studies cost effective by focusing efforts where the caribou are or are likely to be.

Though this effort represents an important first step toward our understanding of the spatial and temporal nature of mainland barren-ground caribou herds, it is our aim to encourage regular updates to the map atlas into the future to ensure effective management, and identify unnecessary restrictions through co-management actions. At present, the DOE is reassessing all seasonal range polygons using telemetry data current to December 2018.

Road Effects on Caribou

The intent of the proposed work is to determine the disturbance effects of roads and other linear structures on the behaviour and movement patterns of barren-ground caribou. Roads are considered one of the most significant threats to the long-term viability of migratory barren-ground caribou herds. Road structure, orientation to migratory routes, usage, and increasing access to caribou habitat, all play a role in the ultimate impacts of roads on the long-term viability of caribou populations. We are only beginning to understand the negative impacts of roads on caribou and more intensive research is required if managers are to understand how to mitigate the effects through proper road construction practices, placement, uses, as well as where prohibitions of roads are required due to inabilities to mitigate effects. This mitigation must also ensure that Inuit harvesting rights under the Nunavut Agreement are protected. This work represents an acceleration in our attempts to measure disturbance effects in the shadow of declining caribou herds across northern North America and dramatic increases in resource development interests on critical caribou habitat.

Wildlife-road interactions are complex and often involve effects across multiple scales, from changes in individual movement patterns, to shifts in seasonal distributions. Using the Kivalliq

Caribou Monitoring Program telemetry database, three approaches were applied to examine the potential effects of an all-weather mining road on caribou seasonal movement patterns: 1) trajectory characterization, 2) a biased-correlated random walk (BCRW) model, and 3) a mixed effects regression model. Preliminary results indicate an increase in road avoidance during the fall migration (after the road was constructed), demonstrated by an increase in the frequency of avoidance movements between the pre- and post-road construction periods. In the fall, the regression analysis identified higher tortuosity (meandering or non-linear movements), as caribou ventured closer to the road. The increased tortuosity represents greater milling behaviour (clustered movement) and avoidance movements (deflections to the north and south) by caribou within 36 km of the road (Figure 5.18). Slowed movement and avoidance of the road by caribou appears to indicate that the road may be acting as a semi-permeable barrier to movement. Further analyses of the zone of influence using higher frequency movement data, different definitions of distance to road, and the incorporation of traffic volumes into the regression analysis will assist to investigate the effects of mining and road infrastructure on caribou movement patterns.

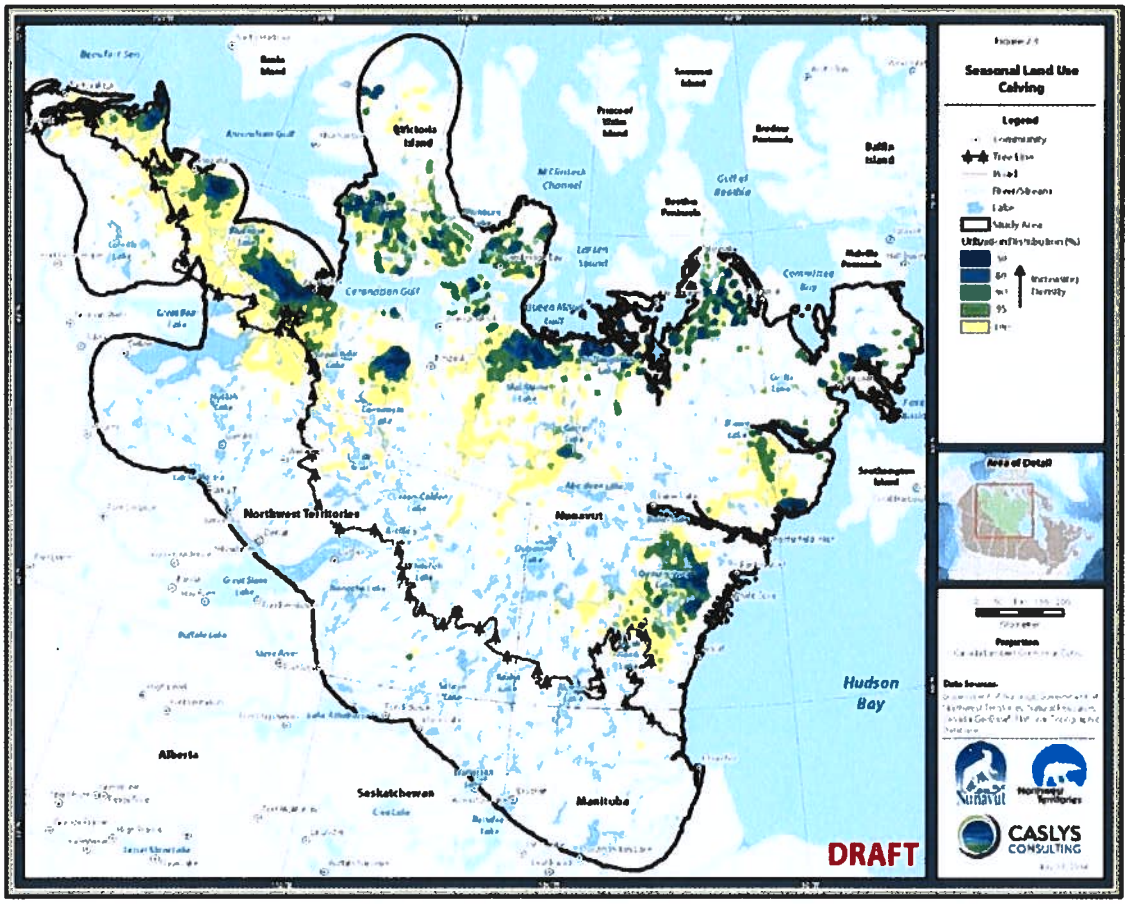

Figure 5.17. Core calving extents of Nunavut's mainland migratory barren-ground caribou herds.

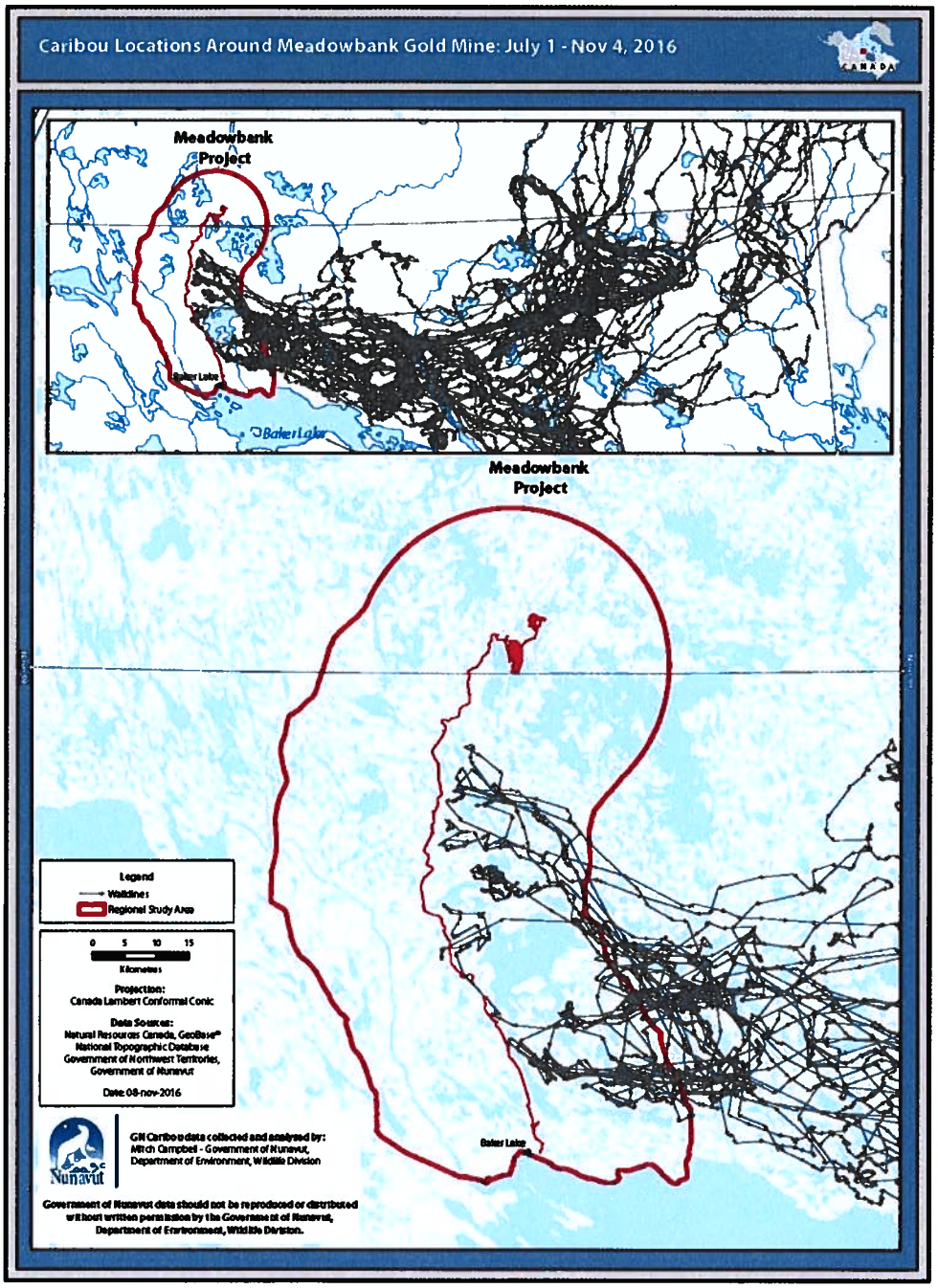

Figure 5.18. The deflection of barren-ground caribou from the Meadowbank all weather road.