

# Estimates of wolverine density from mark-recapture DNA sampling, Aberdeen Lake, Kivalliq Region, Nunavut, 2013-14

## Summary

This report presents results for a wolverine (*Gulo gulo*) DNA mark-recapture study in the Kivalliq region, Nunavut conducted to establish baseline population abundance and density estimates for long term regional monitoring. Wolverine is an important cultural and economic resource traditionally harvested by Inuit. We used genetic analysis to identify individual wolverines from hair samples collected noninvasively by a science-driven study design and logistics facilitated by local hunters. From late March through early May 2013 and 2014 we sampled a grid of 209 posts baited with caribou (*Rangifer tarandus groenlandicus*) meat and scent lures spaced in 4x4 km (16 km<sup>2</sup>) cells for three 10-day sessions in a 3,344 km<sup>2</sup> area north of Aberdeen Lake. In total we detected 21 (9F:12M) individual wolverines over two years of sampling, including eight individuals identified in 2013 and recaptured in 2014. Spatially explicit capture-recapture (SECR) methods were used to estimate density and average number of wolverines on the grid at any given time. Average or resident wolverine density was 2.36 wolverines/1,000 km<sup>2</sup> (SE = 0.34) in 2013 and 1.66 wolverines/1,000 km<sup>2</sup> (SE = 0.29) in 2014. Estimates of superpopulation size (number of wolverines within the effective sampling area) were 21 (CI=18-26) in 2013 and 14 (CI=11-19) in 2014. Superpopulation estimates were close or slightly above the number of unique wolverines detected on the sampling grid for each year, which suggests sampling was effective in detecting all the wolverines on the grid as well as the immediate surrounding area.

Simulations of sampling designs (post spacing and grid size) suggest that increasing post spacing while reducing the number of posts sampled can increase wolverine sample size and precision of the estimate. Wolverines in the area exist at low densities and are being exposed to increasing levels of human activity, with existing or proposed mining and subsistence harvest. Our results contribute to baseline data for wolverine ecology in the eastern mainland Arctic tundra and can be used to generate regional population estimates for future monitoring. The estimates can be used to evaluate current harvest, can provide a quantitative basis to establish future sustainable harvest limits and will support inputs to the Nunavut Impact Review Board (NIRB) review process. This collaborative research project with the Baker Lake Hunters and Trappers Organization (HTO) has provided valued training, employment and technical skills transfer to HTO members. Our results suggest that by involving local hunters, DNA based surveys offer a practical and cost-effective method to monitor wolverine populations in tundra situations. For better understanding of wolverine population in the area, we recommend long term monitoring by involving local HTOs and industry. This study demonstrates the efficiency of joint research projects to inform management.

Key words: *Gulo gulo*, wolverine, DNA, density estimates, Aberdeen Lake, Kivalliq, Nunavut, population, spatially explicit capture-recapture.

