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Use of fecal genotyping to estimate population demographics in the North Interlake woodland caribou herd

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The North Interlake woodland caribou herd in Manitoba is part of the boreal woodland caribou population listed as threatened under COSEWIC. In order to monitor the North Interlake herd, fecal samples were collected from 2004 to 2007 providing a source of DNA for use in mark-recapture modeling. For each collection, the range was systematically surveyed using fixed-wing aircraft and the cratering sites were accessed via helicopter. Collection of samples took place when snow was present (early and late winter) to allow for tracking and location of caribou cratering areas and to prevent degradation of DNA present in the mucosal coat surrounding fecal pellets. Following DNA amplification, genotypes were scored at six polymorphic loci using GeneMarker software and then compared using GenAlEx 6.1; where samples matching at five of six loci were considered as matches and samples with missing genotype information at two or more loci were excluded from analyses. In total, 610 samples were collected from the six surveys, whereby 190 unique genotypes were obtained with a sex ratio of 1.03:1.00. MARK software was used to derive population estimates. Closed population estimates using the 2007 samples (two collections of 303 samples total) demonstrated a population size of 145 animals (95% confidence interval: 115 to 175). As the precision of this estimate is 21%, it is proving useful in management. For open population modeling done using samples collected 2004-2007, we obtained a population growth rate, lambda, of 1.00 (95% confidence interval: 0.98 to1.02). We recommend the continued collection of fecal samples for DNA analysis as a valuable and noninvasive technique in acquiring demographic information on threatened woodland caribou.