

Determining the Genetic Distinctiveness of the Cape Breton Marten (*Martes americana*)

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The American pine marten is a small member of the weasel family, about the size of a mink. It has chocolate-brown fur, with an orange coloured throat and chest. Its long slender body, short limbs, broad feet, and sharp claws make it well adapted for climbing trees, traveling across the forest floor and snow, and for capturing mice and voles that are its main foods.

Since the early 1900s, there has been serious concern for marten populations in Atlantic Canada. The marten population on PEI became extinct in the early 1900s and the population in Newfoundland and Labrador is listed as endangered with less than 300 individuals. In June 2001, the Cape Breton Island (CBI) marten was provincially listed as "Endangered" under the Nova Scotia Endangered Species Act. Today, marten in Nova Scotia are split between two populations; western Nova Scotia and the Cape Breton Highlands.

Historically, the marten on Cape Breton Island number over 100 animals. Based on available information (historical data, winter track/bait station surveys, sighting reports from trappers and the public), marten numbers in the highlands are at a critically low level. This alarming decline appears to be due primarily to habitat loss and fragmentation.

The older softwood and mixed-wood forests which are critical habitat for marten have been drastically reduced throughout most of Cape Breton. This severe habitat fragmentation has resulted in two geographically isolated sub-populations, leading to reduced breeding opportunities among individuals. Because of the small fragmented population, the loss of genetic diversity due to inbreeding could become a threat to the remaining marten in Cape Breton. In addition, the Cape Breton marten are thought to have been separated from their mainland counterparts for over 10,000 years, and may represent a genetically distinct subspecies. Other threats which could have a major effect on small isolated populations are stochastic or random events such as disease, extreme

weather and forest fires. Given the small population and isolation of the individuals, every animal becomes an important link in the survival of the species.

Our understanding of the general taxonomic status (where animals fit into the larger species) of the marten is evolving, owing primarily to the increased availability and use of various genetic assessment techniques. On the basis of morphological characteristics such as size, shape and colour, as many as six distinct marten species and 14 subspecies have been described globally. Some suggest that there are two distinct species in North America, *Martes caurina* found in the southwestern region of the species' distribution, and the more common *Martes americana*, found across the remaining North American range from Alaska to Newfoundland and Labrador. Each species contains seven subspecies. The Cape Breton population is currently considered to be of the nominate subspecies *Martes americana americana*. This is the subspecies originally occurring throughout the Maritimes, southern Quebec, Ontario and eastern Manitoba.

The Cape Breton Marten Recovery Team is developing priority actions towards recovery of this species. Currently, the team's main objective is to determine the genetic distinctiveness of the Cape Breton marten population. With a national listing in Newfoundland and Labrador, and a provincial listing in Nova Scotia, the marten has been identified as a regional priority species in the Parks Canada Atlantic Species at Risk (SAR) Program.

A major planning problem for the recovery team is the uncertain status of the CBI marten, both in terms of population and its genetic distinctiveness. Should the CBI marten not be genetically distinct, then options to recover the population could be altered to assign a higher priority to the supplemental introduction of animals from elsewhere in Nova Scotia, or from New Brunswick. In this case, a clear option exists



This mature male has been tracked since February 2003.

to re-populate Cape Breton through a reintroduction of marten once sufficient habitat develops to support a larger population. Re-introductions of marten have been successful in many areas of North America, including Kejimikujik National Park by Parks Canada.

Work in Newfoundland and Labrador has indicated that marten there have a significant level of genetic distinctiveness from mainland marten, while others suggest that isolated regions such as Cape Breton may show a greater level of genetic structure. Before a reintroduction program can be considered, the genetic distinctiveness of the Cape Breton population must be determined.

As has been required for many endangered species globally, the development of a captive breeding program for CBI marten may be an option, depending on the results of DNA testing. Such a program would entail a high degree of risk, especially when the number of remaining animals is unknown. The decision to develop a captive breeding program would be taken only if the committee believes, on the basis of available evidence, that extinction is imminent and the Cape Breton population is determined to be genetically unique. The potential for successful application of a captive breeding program may also be influenced by the number of animals and the limited gene pool.

Determination of the genetic uniqueness of the CBI marten is the most pressing objective for their recovery. Tissue samples from Cape Breton marten, as well as samples from marten in Nova Scotia and other areas of North America, are currently being analyzed by the Laboratory of Genomic Diversity, National Cancer Institute (USA), to determine the uniqueness of the Cape Breton marten relative to mainland populations. If the Cape Breton marten represent a genetically distinct subspecies, they would be one of the most endangered mammals in North America.

Beyond Genetics

Various field studies have been initiated to begin to piece together habitat requirements and availability and abundance of prey for

marten. Much of this work has been undertaken with the support of StoraEnso, Port Hawkesbury. Also, a concerted effort has been made to map the distribution of animals that remain on the Island.

The western mainland population, is partially a result of a re-introduction program in Kejimikujik National Park. Between 1987 and 1994 over 100 animals were brought in from New Brunswick and released in the park. Scientific data, and other reports or sightings prior to the introduction, suggest that there may have been some marten persisting in the area. This population is being used as a surrogate for the CBI population to help determine habitat use, home range sizes, behaviour and interactions. Five marten have been radio collared and tracked in the Weymouth area to help in this effort.

The recovery project has also included a series of workshops aimed at increasing awareness among forest managers and workers, and fur harvesters, of alternative wood harvesting and trapping methods that may lessen the impact on marten habitat. In order for the recovery of any species to be successful, all major stakeholders, including the public, must become involved in the recovery process.

Young female marten;
part of radio collar program.

