PHOTO COURTESY OF SHANE MAHONEY

Caribou In Decline

Predators, Prey, and a Comprehensive New Strategy in Newfoundland

The history of the famed Newfoundland caribou has been punctuated by population highs and lows within a challenging milieu of punishing winters, disease, a diverse assortment of predators, and a human culture heavily dependent on wild resources. It is a history of perseverance.

The woodland caribou is the only native ungulate on the spectacular 42,000 square-mile island. An integral part of Newfoundland ecosystems, the woodland caribou is a food source for several predator and scavenger species and, as an occasional browser and catholic grazer, it affects the island's vegetation structure, distribution, and abundance. Beginning with the Maritime Archaic Indians who colonized the island shortly after the last glacial retreat, Newfoundland peoples have relied heavily on caribou for food, shelter, and clothing. Today the caribou retains tremendous cultural, economic, historic, and intrinsic value to Newfoundland hunters and non-hunters alike. While Newfoundland is perhaps more famous for its abundance of moose, introduced to the island in 1904, the caribou remains the prominent symbol of Newfoundland wildness, majesty, and character. Currently the population is experiencing a dramatic decline, raising serious concern about the caribou's future. The eco-tourism industry, which includes hunting, relies heavily on caribou abundance and vitality and has already shown financial losses.

By Steve Gullage
Caribou Strategy Field Programs Coordinator –
Government of Newfoundland and Labrador
Division of Sustainable Development and
Strategic Science

Shane Mahoney
B&C Professional Member
Executive Director –
Government of Newfoundland and Labrador
Division of Sustainable Development and
Strategic Science

Caribou Decline

Biologists and hunters first detected waning numbers in the late 1990s. Since then, Newfoundland's caribou population has experienced an astonishingly widespread drop from approximately 100,000 animals in the mid-1990s to around 34,000 today. A striking early observation was the extremely low number of young animals present within almost all island herds. This low recruitment of young animals was obviously implicated in the population decline, but the cause was unknown. Research initiated at that time confirmed that the cause was indeed low calf survival, falling to less than 10 percent in many herds, rather than declining birth rates, which were not as seriously affected. Regardless of such insights, the issues of caribou numbers and the reasons for their decline have stirred impassioned debates among hunters, conservation groups, and the general public alike. It remains a contentious topic on radio call-in shows and in the print media, and seemingly everyone in Newfoundland has a theory as to what has happened to the caribou.

The new predator on the block, the Eastern coyote, has taken the brunt of the blame in public discourse. Many people have called for the coyote's eradication, an approach that has met with little success anywhere in North America despite a century of unrestrained attempts. Coyotes are thought to have arrived in Newfoundland from the Canadian mainland in the mid-1980s by hitching a ride on pack ice that every winter fills the 70-mile wide Gulf of St. Lawrence. Sightings across the island became more frequent in the mid to late 1990s, around the time the caribou declines commenced. Intuitively, this was seen as a cause-effect relationship by some biologists and public commentators alike. It seemed obvious and reasonable that the new arrival was wreaking havoc on the island's caribou, gobbling calves in early summer and larger animals in the ice and snow of winter.

Newfoundland is certainly no stranger to new arrivals and their sometimes disharmonious contributions to its ecology. Moose, snowshoe hares, red squirrels, mink, chipmunks, mice, shrews, and voles have all been introduced to the island with varying impacts on the native ecosystem. Given this history and the coyote's reputation in other parts of North America, it was easy to view the coyote as the culprit for caribou problems in Newfoundland. Here coyotes face a new world—a rare ecosystem that contains caribou but no wolves. Where the ranges of the two canines overlap elsewhere in North America, it is the coyote that usually avoids the home ranges of its larger, more aggressive cousin. On the island of Newfoundland the "little wolf" is free to roam where it pleases. While the full picture of the coyote's impact on Newfoundland's ecosystem remains unclear, extensive monitoring reveals that the coyote is not wholly responsible for the caribou's troubles.

Decline Repeated

This is not the first time Newfoundland caribou have declined in numbers. A similar island-wide decline occurred in the period spanning 1900 to 1920 when historical records showed a drop from an estimated 120,000 animals to as few as 10,000 or less. The reasons for that decline remain uncertain but historical records and anecdotal evidence highlight the importance of excessive hunting, predation, and overgrazing of the range. Island-wide, the population of woodland caribou remained low throughout the 1930s and '40s despite the demise of the Newfoundland wolf in the 1920s and the closure of all herds to hunting from 1925–36. Historic records from the legal hunt and local ecological knowledge suggest that the population increased, albeit very slowly, from the mid 1930s to the early 1950s. During that time hunting was resumed but was subsequently closed again when low hunter success indicated continued low numbers of caribou. During a well-known study from 1957–67, caribou showed a trend of slowly increasing numbers island-wide with evidence of stable or slightly declining numbers in some herds. Following this transitional period from low numbers, the island-wide population began showing clear signs of recovery by the early 1970s. It then entered an exponential growth period that saw caribou numbers peak at nearly 100,000 animals by 1996.

The early 20th century caribou decline may have sealed the fate of the Newfoundland wolf and a unique predator-prey system that likely existed on the island since the last glacial retreat. Although wolves are absent today, woodland caribou still must contend with their long-familiar predators that include humans, black bears, lynx, and bald eagles. The landscape still presents both opportunity and risk. But the list of predators has recently expanded to include the coyote. The island's guild of caribou predators is unique and poses considerable challenges to managers who must weigh the combined effect on the island's declining caribou population.

Searching for Causes

In response to evidence of declining calf survival, the government of Newfoundland and Labrador initiated a caribou calf mortality study in 2003 that continues today. This investigation of the causes, rates, and timing of calf mortality has indicated that black bears are the most important cause of calf mortality, just as they were in the 1980s and early 90s. However, coyotes are killing calves as well, and a significant number of mortalities of predator-killed caribou could not be attributed to a specific predator. Some of these are almost certainly coyote kills and some are those of other predators. These uncertainties underscore the complex nature of predation, especially in this unique context. How the various predators apportion these kills remains largely unknown. In a study on three herds from 2003–07, predation accounted for 83 percent of total mortality. Black bears accounted for 35 percent of that predation mortality compared to 16 percent by coyotes (Figure 1).

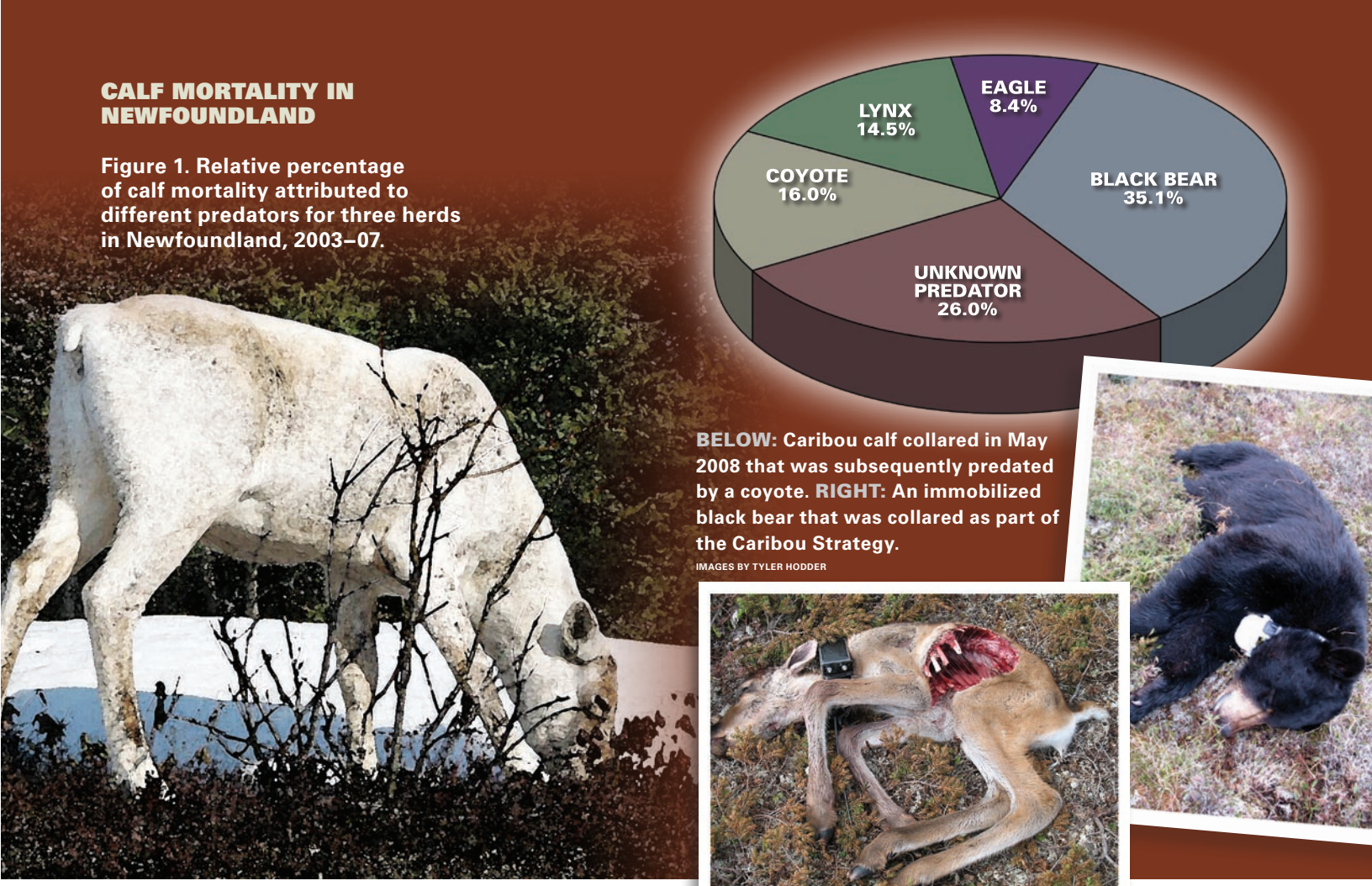
Research also shows that predation may not be the sole cause of the caribou decline. An interaction of many factors may be influencing caribou health and population growth. Similar conclusions have been reached in other caribou studies, although relatively few research projects ran long enough to clarify the many factors involved. An exhaustive analysis of 50 years of Newfoundland caribou research has revealed that along with population decline and high calf predation, caribou have declined in body size, perhaps due to declining nutrition, selective hunting, human disturbance, or general habitat changes. Underlying influences such as population density and possible potential weather interactions were also indicated, especially when caribou populations peaked in the mid to late 1990s. Those findings suggested that a complex interaction between caribou condition and predation might be operating and that a comprehensive strategy to address the problem was required. Such a strategy would have to address the reasons for the decline and the measures that could effectively address them, and implement an effective monitoring program to assess the ongoing status of the caribou herds. This would be no small task, given the size of the island and the fact that much of the caribou range is only accessible by air.

A New, Science-based Strategy

In February 2008, the government of Newfoundland and Labrador announced a $15.3 million allocation to study the Newfoundland caribou under a new Caribou Strategy. This intensive, research-based program involves multiple partners including provincial departments, universities, non-government organizations, and the general public. It will be one of the most extensive terrestrial wildlife studies ever conducted in

CALF MORTALITY IN NEWFOUNDLAND

Figure 1. Relative percentage of calf mortality attributed to different predators for three herds in Newfoundland, 2003–07.



BELOW: Caribou calf collared in May 2008 that was subsequently predated by a coyote. **RIGHT:** An immobilized black bear that was collared as part of the Caribou Strategy.

IMAGES BY TYLER HODDER

Canada. The Caribou Strategy represents a highly significant political commitment to sustainable development and science-based decision making for Newfoundland wildlife. Its holistic, ecosystem-based approach will encompass predator management, population ecology of predators, caribou and predator-prey dynamics, habitat, and socio-economic evaluations. The Caribou Strategy has eight goals, as follows.

- Increase understanding of predator ecology, predator-caribou dynamics, and predator-caribou-habitat interactions.
- Test the feasibility and effectiveness of predator reduction methods as a tool to improve calf survival in Newfoundland's woodland caribou herds.
- Increase understanding of non-predation factors that contribute to calf and adult caribou mortality.
- Improve ability to effectively and appropriately manage woodland caribou herds including the establishment of sustainable and appropriate harvesting regulations,
- Improve ability to effectively and appropriately manage black bear, lynx, and coyote populations.
- Improve public awareness of the complexity associated with the sustainable management of caribou and their predators.
- Develop a larger, more knowledgeable group of hunters and trappers capable of assisting in predator management.
- Establish Newfoundland and Labrador as a leader in knowledge-based sustainable management of wild resources.

One of the most important knowledge gaps to be addressed is the current lack of understanding of predator-caribou interactions and predator population dynamics on the island. Predator density, population size, distribution, food habits and life history traits all require greater definition before we can accurately assess the roles that each of the predators play individually and collectively in relation to caribou population dynamics and to each other. Already we know that predator densities are not uniform across the island, and that the proportion of caribou calves taken by each predator varies between herds. Furthermore, even though lynx are not abundant, they remain effective predators on calves each year. The return of Newfoundland's caribou herds to sustainable population levels may require more intense predator management. However, the feasibility of increased predator harvest will be determined by experiments to scientifically assess the effectiveness of using predator management as a recovery tool. Experimental predator management will proceed after one year's information on predator density and spatial distribution. If caribou are susceptible to decline regardless of predator numbers, then costly long-term predator management interventions may be neither practicable nor warranted.

New Questions in a Changing World

Much also remains to be discovered about the ecological interactions of Newfoundland caribou and their island habitat. Woodland caribou seasonally move short distances from barrens and low-lying bogs in spring to more forested landscapes in late summer and onto lichen-rich barrens and forests in the winter, depending on snow conditions. But these ages-old traditions increasingly are confronted by altered landscapes and human activity. Many questions remain unanswered. Have changes in their seasonal habitats affected caribou nutrition? Are calves more susceptible to predation, either because of their own health or improved habitat for predators? Is weather playing a role in the decline of herds? Possible

ABOVE: Donald M. Vickers with a Quebec-Labrador caribou he harvested near Lac Ribero, Quebec, in 2006. The bull scores 422-3/8 points.
RIGHT: This woodland caribou was taken by John McTurk near Deer Pond, Newfoundland. The bull, harvested in 1996, scores 352-2/8 points.

CARIBOU BOUNDARIES FOR RECORDS-KEEPING PURPOSES

The Quebec-Labrador caribou category was established in 1968. This large woodland caribou has very wide, long-beamed antlers with almost universally palmated bez formations. To have left these animals in competition with the woodland caribou of Newfoundland would have resulted in a complete swamping of the smaller-antlered woodland caribou from Newfoundland. The field photos at left represent trophies near the top of their respective categories. You can see the difference in antler size. Boundaries for Quebec-Labrador caribou are just as the name implies, Quebec and Labrador.

Woodland caribou are eligible for entry from Nova Scotia, Newfoundland, and New Brunswick. Woodland caribou occur sparingly all the way across Canada to southern British Columbia. Although there may be some open seasons in these provinces, they are not taken in large numbers anywhere. It would seem inappropriate to place such animals in competition with those from Newfoundland where they have been regularly hunted for more than 100 years.

influences of climate change include deeper snow, a more rapid spring melt, more variable precipitation events in winter (e.g., freezing rain), and changes in vegetation green-up that may no longer optimally coincide with caribou calving schedules and other crucial life history patterns.

We also need to consider how human activities play a role in the decline of caribou. Timber harvesting in Newfoundland has been linked to habitat loss in the past, and is reported as an important source of habitat degradation for woodland caribou populations in other areas of Canada. Developments such as hydroelectric dams and mining exploration have been shown to contribute to caribou habitat fragmentation in Newfoundland. Activity associated with resource extraction is also known to induce avoidance behavior in caribou, as are recreational activities such as snow machine and all-terrain vehicle use, both popular pastimes with Newfoundland residents. Such stressors may affect the health of adult caribou as well as calves, making them more susceptible to predators. We need to find out how these stressors add to or complicate the caribou decline issue. Such questions will be at the heart of the Caribou Strategy.

Status of Newfoundland Caribou

Currently the Newfoundland woodland caribou is not listed under Canada's Species at Risk Act (SARA). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) last assessed the Newfoundland population in 2002 and made a "Not at Risk" determination based on the following factors: predation pressure was presumed low due to the absence of wolves; habitat was judged to be secure; and, only a single herd was confirmed as decreasing. The population figure used in the 2002 report was 100,000 caribou in Newfoundland. Things have obviously changed. Recent surveys have confirmed around 34,000 animals, indicating a greater than 60 percent drop within a decade. With such a rapid decline underway, populations of Newfoundland caribou are more likely to receive an at-risk designation (Endangered, Threatened, or Special Concern) when the next COSEWIC assessment is carried out.

While providing an essential foundation, science alone will not stem the rapid decline of the Newfoundland woodland caribou. That is why the Caribou Strategy includes a strong emphasis on predator management. It is essential for people to stand up as stewards of the land and take action to secure a sustainable future for this magnificent animal. At the same time we must acknowledge the uncertainty in our ecological knowledge, and the intrinsic value of predators and prey. A science-based intervention is considered reasonable with the information we now have, but the many logistic and financial uncertainties necessitate an experimental approach. Woodland caribou can still be hunted on the island of Newfoundland, and there remains over 34,000 healthy animals—more than all other jurisdictions combined. We must remain engaged and optimistic in this endeavor. Predator management is an option we are pursuing, but not haphazardly, nor at any cost. In working toward its objectives through an inclusive approach, the Caribou Strategy is bringing people together in common purpose, striving to safeguard the future of Newfoundland's caribou. ■