

KNOWLEDGE BASE

Solving Mysteries in the Boreal Forest



Winifred B. Kessler
PROFESSIONAL MEMBER
Boone and Crockett Club

A highlight of the Christmas holidays took place a few miles from my home in northern British Columbia. In full daylight, a lynx crossed the road right in front of my car, providing an excellent look at this

normally reclusive animal. The sighting especially pleased one passenger, a biologist from Washington state, who exclaimed that she had trapped, radio-collared, and studied lynx for years but had never actually seen one in the wild outside of her studies.

If lynx sightings are to be had up here, this is definitely the year. Neighbors returned from their trap lines with more lynx than they've seen in years. It is a peak year for snowshoe hares, a favorite prey of lynx. Whenever I venture on skis, the snow is crisscrossed with their tracks and droppings. The dramatic cycling exhibited by snowshoe hares and lynx is a fascinating phenomenon of Canada's boreal forest, and one that mystified people for countless generations.

From the hare's perspective, living with the constant threat of being eaten can significantly impair one's ability to thrive, survive, and reproduce.

Although Canada's aboriginal peoples had for centuries observed the wide fluctuations in hare and lynx abundance, hard numbers were not available until the onset of trapping by the Hudson Bay Company. Over 200 years of trapping records showed distinct cycles of boom and bust in snowshoe hare populations, with similar cycles of lynx trailing slightly behind. These cycles were observed from Alaska to Labrador with hare densities reaching more than 100 per square kilometer at the peak and falling to a single hare per square kilometer at the low.

Several competing theories ventured to explain the cycles. One suggested the hares as the driver, eating themselves out of house and home in peak years and then crashing, thereby triggering the cycles of lynx that depend on them for food. Conversely, another theory had the predators as the controlling drivers of hare abundance. Research in the 1970s suggested the cycles were "forced oscillations" brought on by forest fires and patterns of precipitation. Still other studies found evidence that increasing numbers of hares triggered a "fight response" by plants, which produced a chemical causing lowered palatability to hares.

One of the boldest attempts to solve the mystery was launched in 1986 as the Kluane Boreal Forest Ecosystem Project, situated on a 350-square kilometer study area in the southwest corner of the Yukon Territory. Renowned ecologist Charles Krebs and scientists from several Canadian universities

(British Columbia, Alberta, and Toronto) completed a decade of focused work on food webs, predator and prey diets, habitat dynamics, and experimental manipulation of predators, prey and vegetation. Funded by Canada's National Sciences and Engineering Research Council, the multi-million dollar project produced more than 103 publications and theses and set in motion a longer-term monitoring program.

And what did they find? The study refuted the theory that food shortage, followed by predation, is what causes the hare cycles. The explanation is a complex one, involving three levels of interaction among hares, predators, and food supply. Predators were found to have an extremely important effect on the hare population, not just through direct mortality, but also by inflicting chronic stress with associated physiological impacts. From the hare's perspective, living with the constant threat of being eaten can significantly impair one's ability to thrive, survive, and reproduce.

No doubt our understanding of this phenomenon will continue to evolve as researchers apply ever more sophisticated technology and methods to the problem. I feel fortunate indeed to live in an area where the natural cycles of life prevail, to be seen and enjoyed by anyone with an inquisitive mind and an affinity for the outdoors. ■

W. B. Kessler

