

SEASONAL SIGHTS AND SOUNDS IN ALBERTA: WEASEL WINTER SURVIVAL

BY SALLY STUART

Weasels are awake and active all winter long. Hidden from sight beneath the snow, they must hunt or perish. Despite seldom encountering a weasel, it is a waft of musk scent in the air, a small tunnel at the base of a tree or delicate footprints in fresh snow which alert me to their presence. Imagine my surprise one winter to find a tiny mouse stomach deposited on a log in the woods. Later enlightened by *Mammals of Alberta* (Pattie and Fisher) I learned that it was most likely placed there by a Short-tailed Weasel, which consume every part of their prey except the stomach.

Weasels belong to genus *Mustela*, which in Alberta include four species: Short-tailed Weasel, Long-tailed Weasel and Least Weasel as well as American Mink.

Members of the weasel family are ferocious carnivores. Anatomically, their bodies are ideally shaped for their predatory life style. Thin and incredibly flexible, they squeeze into the burrows and tunnels of prey species. According to *Alberta Mammals* (Hugh Smith 1999) the Least Weasel is the smallest carnivore in Alberta, weighing only about 34 grams. The Long-tailed Weasel weighs 340 grams. Smith reported that Least Weasels are common in most areas in Alberta, but the status of the other two species is less clear. Being a small mammal, one might surmise they are relatively common. However, iNaturalist records in Alberta to date show only 114 Long-tailed Weasels, 16 Least Weasels and no Short-tailed Weasels. Sadly, most of these observations were of dead animals. It is not known if numbers are declining, but a North American study conducted by David Jachowski et al. in 2021 indicated that the populations all species (especially the Long-tailed Weasel) are in decline. Suggested reasons are not surprising: declining and fragmented habitat as well as competition and predation by mammals such as red foxes (which are currently experiencing a resurgence).

Home Ranges: Kimberly Ann Lisgo (1993) studied Short-tailed Weasels in the mixed wood boreal forest of Alberta. She found that females had a home range of about 73 ha (180 acres) while the somewhat larger males required 165 ha (408 acres). Ranges are smaller in habitats that are rich in prey. Although there may be some overlap of ranges, these large territories means that there are few weasels in a given habitat.

As endotherms and homeotherms, weasels must maintain a constant body temperature within a narrow range of self-generated energy. They are unable to put on an insulating layer of fat, since any increase in size would make it more difficult to enter small holes and burrows. The problem is further compounded as they lose heat easily due to the large surface area to volume ratio of their long, thin bodies.

Strategies to Cope with Cold: High metabolic rates enable them to generate heat (according to Mark Linell [2016], their heart rate is about 400 beats per minute). During cold weather, they must consume large amounts of food to support their high metabolism. Limited by their small stomachs, they need to consume about one third of their body weight every 24 hours.



They prey on mice, voles and even red squirrels, consuming everything but the stomachs and often using the skins of their prey (sometimes in usurped homes) to insulate their subnivean nests. However, life is still precarious.

Pelage Change: Weasels have short fur, but it may become thicker during the winter. Their fur also changes colour, from brown in the summer to white in the winter. The mechanisms of seasonal colour change are complicated and still not well under-



stood but it is strongly influenced by genetics. A review by Marketa Zimova et al. (2018) notes that pelage colour change has probably evolved independently in 21 species. Photoperiodism (hours of daylight) regulates this moulting process.

Hair colour is due to the pigment melanin, which is produced by special cells called melanocytes, which in turn are under the influence of the melanocyte stimulating hormone (MSH). Melanocytes are found in hair follicles. The initial response that stimulates pelage colour change in the fall entails the cells in their eyes reacting to a reduction in light. A cascade of hormones then results in less MSH. No MSH means no pigment. When the animals moult, their pelage is white. In theory, the white colour provides a little extra insulation, due to air trapped in its structure. In some species, each white hair is thinner (although not in the Least Weasel) allowing for an increase in density.

The main advantage of being white is the camouflage advantage it provides when hunting atop the snowpack. Interestingly, two species have a black tip to their tail. Better lose the tip of a tail to a predator than be fatally wounded. Least weasels do not possess this, perhaps since it would be useless with such a short tail.

Other Strategies: A fascinating strategy used by Least Weasels was discovered by Javier Lazaro et al. (2017). Researchers found that weasels reduce metabolic requirements in the winter months by decreasing their skull and





perhaps brain size. Only males regrow skulls in the summer. It is speculated that female skulls do not regrow because they must direct their energy to their fetuses and then caring for young. This phenomenon has also been observed in shrews.

A further adaptation, known as delayed implantation, occurs in the Long-tailed and Short-tailed species. Sexes live separate lives for

most of the year, but when breeding season arrives the male must locate the female., which comes into estrous once a year for three to four days He often travels long distances, tracking urine odour. Male Long-tailed Weasel testes reach maximum size in April to July. According to The Encyclopedia of Mammals, breeding is a rough process. Males grab females by the neck,

hauling them back and forth before mating. The penis is stiffened by a bone (the baculum), facilitating copulation periods of up to four hours. Such aggressive copulation induces ovulation. The fertilized egg passes down the fallopian tubes to the uterus, where it divides into a blastocyst. Instead of implanting in the uterus, low levels of progesterone leave the blastocyst floating in suspended animation for up to nine months. With spring bringing longer hours of daylight, progesterone levels increase and cause the blastocyst to implant. This timing ensures that the young are not born in the winter months, when food is scarce. Why the polyestrous Least Weasel, which has two or more litters per year, does not exhibit this characteristic is unknown.

When walking in nature, keep a vigilant search for weasels. Use both visual and olfactory cues. Maybe you will be as lucky as a group of birders in Calgary were in October 2011, when they encountered a Least Weasel and her eight young. Explore the remarkable pictures online (Birds Calgary Weasel Wednesday).



Page 3 top left: Long-tailed Weasel, winter pelage (photo taken March 24)

Page 3 middle: Short-tailed Weasel, winter pelage

Page 3 bottom right: Long-tailed Weasel, summer pelage

Page 4 top left: Short-tailed weasel, winter pelage

Page 4 bottom, from top left: Long-tailed Weasel (April 8, April 13, April 21, May 3)