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Eye on The Environment: Mountain Goats and Predator Winter

By Anne Dahl for The Seeley-Swan Pathfinder

Winter is beginning to ebb in the Swan Valley. But on the high ridges of the Mission Mountains and the Swan Range spring is a long way off. The toughest months for mountain goats are just beginning.

I've recently reread Doug Chadwick's book, "*A Beast the Color of Winter*," about his experiences in the 1970s studying mountain goats (*Oreamnos americanus*) on the Swan Range and in Glacier National Park. Chadwick, who lives in Whitefish, has since become a well-known "science writer" with contributions to National Geographic and his more recent book, "*True Grizz*."

For mountain goats, winter is the primary predator. The bearded climbers, as Chadwick calls them, have avoided most of the animal predators—wolves, mountain lions and bears—by finding their niche on the extreme high, steep and cold cliffs of the Rocky Mountains, Cascade Range and Coastal Range in British Columbia and Alaska.

Mountain goats stay warm without GoreTex and down parkas by breathing faster than we do. Their heart rates are faster and their body temperatures are naturally about four degrees warmer. Their digestive system acts like an active compost heap, according to Chadwick. The bacteria and protozoans in the rumen keep the mountain goats warm as they busily break down the lichens and plants the bearded ones consume.

"In effect the beast is cooking with gas, enjoying a measure of free heat while you shiver and hop around rubbing your arms..." Chadwick says.

A more obvious advantage mountain goats have over people is their dense double coat of fur that traps thousands of tiny air pockets and holds the heat in. Their coat is white, which seems counter productive to winter survival, but a dark colored coat would absorb too much heat in the summer.

If mountain goats have had plenty to eat in fall, they develop a thick layer of subcutaneous fat that adds insulation. The feet and lower legs of mountain goats are designed to stay cold. The hooves, hair, cartilage, ligaments, and bones of the lower leg and foot can function in any weather. There is very little living tissue to protect. The heart pumps just enough blood to the extremities to keep what little living tissue there is alive.

Snow is another insulating factor. Mountain goats like human explorers have learned to use snow to stay warm in a storm. They paw a nest in snow, bed down with their legs under them and let themselves be buried.

I once read about an explorer who employed the same strategy when he got lost during a blizzard in Antarctica. He hadn't traveled far from the safety of his camp when he realized he couldn't see to find his way back. Rather than wander aimlessly he took a wrench out of the pocket of his high-tech snowsuit, scratched a shallow hole in the snow and lay down to be buried by the storm. He woke in the morning with no ill effects and shocked his friends by jumping up after hearing them call his name.

Mountain goats, like other mammals, also use caves, clefts and overhanging ledges for protection. In winter most mountain goats avoid the worst weather by moving downhill one thousand or more feet to the lowest cliffs. In British Columbia and Alaska this can mean descending nearly to the shore of the sea.

Avalanches and starvation are the main winter hazards. Well-fed adults are most likely to survive the winter. The kids, yearlings and juveniles often don't make it. Chadwick says winter helps keep the herd size in check, while for lowland ungulates, herd sizes are regulated by predators and disease as well as by harsh winters.

Adult mountain goats use their powerful forelegs to paw through the snow and find plants and lichens. Kids of the year are allowed to share these feeding pits with their mothers. But yearlings and juveniles must fend for themselves.

The young kids can curl up with their mothers and benefit from their parents' body heat and sheltering mass. The kids need this help because they have less fat on their bodies and food in their digestive tracts to keep them warm. During severe winters, pregnant mountain goats struggle to stay alive. They may abort their fetuses, and the kids that are born after a long winter may be smaller and less able to survive the first hours and days of life. Kids born during storms can die from hypothermia.

Chadwick observed *Oreamnos* during spring avalanche season. The mountain goats tended to ignore the sounds of nearby snowslides, only reacting when they were in the direct path of an avalanche. "The ears go back and the tail up, and they are on their way at a gallop," Chadwick said. "If they are already on a steep section of cliffs they will seek a protective overhang. Lacking that they pace and stamp, and as the sound rumbles closer they crouch. And then when the ground starts to vibrate, they squeeze tightly against the uphill rock as if trying to press themselves into a crack."

No one knows how many mountain goats die in avalanches. But bears and researchers have learned to search the bottom of avalanche chutes for their remains. Over 60 percent of the 30 mountain goat carcasses Chadwick found were in avalanche debris. Avalanches are more responsible than predators and disease for the corpses that people find. But Chadwick acknowledges avalanches bring carcasses down to where researchers *can* find them.

This has been a warmer than usual winter during a warmer than usual cycle of years. In the Introduction to the 2002 Bison Books edition of "*A Beast the Color of Winter*," Chadwick poses the question of how mountain goats will respond to global warming. He wonders how the beasts will manage with the hotter summers, because the animals have trouble dealing with heat. They are designed for long, cold winters and they have avoided over populating and decimating their environments with the help of Predator Winter.