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experience of observing the boreal forest in which they live, hunt, and trap.

On these trips the participants often take me to cutblocks to explain to me the changes that logging brought to the environment, local animals, and to their lifestyle. Paul, a local trapper in Wood Buffalo National Park, who not only looks like David Suzuki but also holds a vast knowledge on the local environment, takes me to his trapline. We visit the places where the local bison herd has carved a trail into the landscape to come and drink at a small creek. From the canoe we can see the willows that were turned over by feeding moose. We stop at a beaver den to listen to the calls of hungry little beaver kits, and move on to watch an owl family with their maturing chicks. As we continue up the creek, Paul points towards logs below us in the water. Smaller log-jams are everywhere. He explains to me that when clear-cut logging was allowed in Wood Buffalo National Park, the logging company logged in winter and used part of the creek as an ice road and for timber storage. They left a lot of timber behind, which eventually jammed up the creek. Before the logging, Paul was able to canoe the creek from its source lake to the Peace River. He has not been able to do this for many years. He is disappointed that neither the forest company nor the Park ever bothered to clean up the mess.

On another occasion, a liaison takes me to meet his uncles. The two brothers had a trapline in the Caribou Mountains where they trapped for fifty years. Their knowledge of the local woodland caribou is fascinating. I learn details about caribou seasonal foods, and the strategies caribou mothers use to protect their calves from wolves. One of the brothers recalls how, in his youth, he and some relatives came across a woodland caribou herd of about 1000 animals. Although he came across a herd of about forty animals many years later, he never saw a large herd like the first one again.

The field season earned many pages of interview transcripts, field notes, and map material. It also gave me a deep appreciation for local knowledge and the knowledge keepers. I recently completed the transfer of map data into GIS format and hope that ultimately the band will be able to use the results for sustainable resource planning and management. Many of the observations of the elders are unique and open new doors for future research. Personally, I believe that the biggest contribution that this research has to offer lies in creating an awareness towards the environmental knowledge that still exists in Northern Alberta's Native communities. Local hunters and trappers are often overlooked when it comes to decision-making over local resource use. By involving local knowledge experts as legitimate stakeholders, better planning of culturally and environmentally sustainable resource management for all groups interested in the boreal forest is possible.

Why Moss Matters, Too

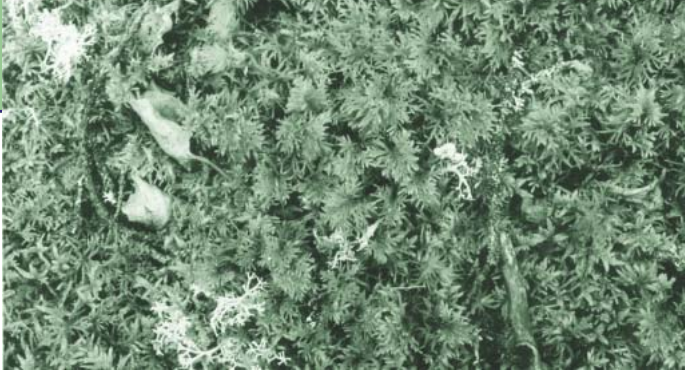
by *Michael Simpson,*

PhD Student,
Department of
Biological Sciences

So what is moss? It's green, right? It grows on roofs, in sidewalk cracks and lawns? It's mighty small and it doesn't flower. So what? Well, diminutive it may be, but there is much more to moss than meets the eye, especially here in Alberta.

In our boreal spruce forests, mosses — there are many of them — cover the ground like a green shag carpet. Consequently their contribution to the biological diversity of this ecosystem is substantial. So, too, is their importance to other wild things. They are a forest within a forest for many invertebrates, amphibians and small mammals that live in, on or underneath them. They can be a barrier between falling seeds and the soil, preventing germination, or a cool, damp nest that encourages it. In thick layers they also keep soil temperatures low, slowing the rate at which some things grow and others rot away. Yet, despite their influence in this ecosystem, we know relatively little about them.

Mosses are bryophytes, a group of seemingly primitive plants that have no roots and take in water through their thin leaves. This means they need high humidity if they are not to dry out. Yet, they can be far more forgiving of drought than most houseplants. Even after they have been dry for months,



shrivelled shoots will miraculously recover again and again given fresh infusions of water. This resilience allows them to live in a remarkable range of environments. In addition to lawns, forests, bogs, streams and lakesides, they occupy habitats as extreme as the Mojave Desert and Antarctic islands.

In the boreal forest, though, drought is not the greatest danger; fire is. At its most fearsome it burns to death even the sturdiest trees. Mosses exposed on the soil surface have no chance. However, even infernos like the one that caused heartbreak in Chisholm last spring do not keep them down for long. Even as it kills, fire clears the way for a new generation. If they are not disturbed again any time soon, these tiny plants will take back the land and regain their influence in the forest's web of life. It is because of their pervasiveness and significance that one of nature's most fire-prone ecosystems is among our most important bryophyte habitats.

This notion of importance is associated with a desire to sustain our natural history and natural resources. It has led companies harvesting timber in the boreal forest to try emulating the effects of fire in order to preserve the conditions that maintain the interrelationships between the forest's plants and animals. It follows that failure to recognize how the lives of bryophyte species are related to disturbance will undermine efforts to conserve the boreal forest's biodiversity.

Mosses colonize burned areas by spores and vegetative fragments distributed through the air or preserved on-site. But

which of these sources is most important, and under what conditions, is unknown. Moreover, this is just the beginning; regeneration of plant communities after any large-scale disturbance is not static. As time passes, species come and go. Typically, weedy types are squeezed out by more robust and vigorous plants. Ecologists call this process of vegetation change succession. The vast majority of research into succession has targeted higher plants. Little is known about whether, what, and why changes in boreal bryophyte communities occur over time.

This is where my research comes in. Under the supervision of Dr Mark Dale at the University of Alberta, I am looking at factors that might influence the development of bryophyte communities in the first few years after fire and logging.

Boreal forests have evolved under dry, stormy summer skies. On the ground woody litter builds up faster than it breaks down. Under these conditions, fires are inevitable. It is reasonable to assume, therefore, that some boreal mosses have adapted ways to survive fires and exploit the conditions they create. But conditions on harvested sites may be very different from those left by fire.

Severe fires kill all living vegetation, but the trunks of torched trees that are left standing provide shelter from the summer sun. Because this reduces water loss from growing plants and the soil, it makes conditions less stressful for colonizers. Fires also return nutrients to the soil, in the form of ash, that would otherwise be locked up in wood and living materials for decades.

In contrast to fire, harvesting does not remove vegetation indiscriminately; hence, survivors have a head-start when the disturbance is past. Cut trees dragged across the ground break up the soil crust while heavy machines compact deeper layers. Where trees have been completely removed from even a small area, the soil surface will experience the full

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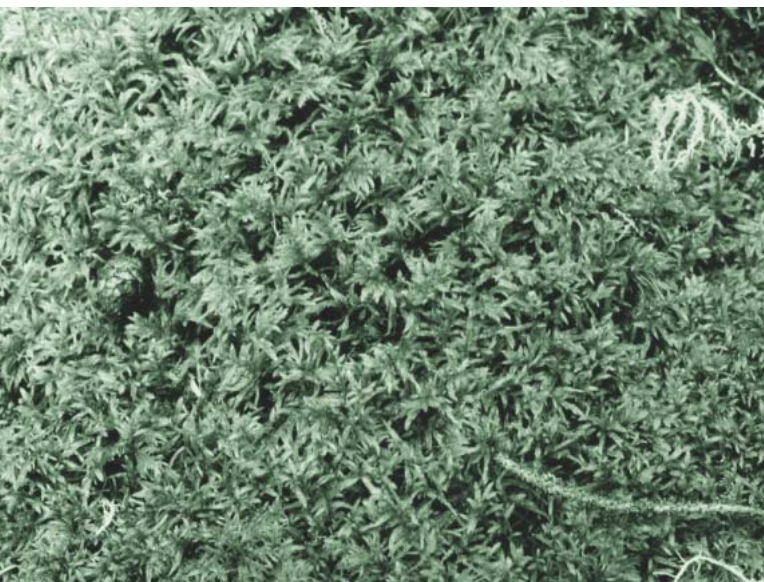


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intensity of the elements. And the harvesting of trees represents a complete removal from the system of large amounts of organic nutrients that could otherwise gradually decompose. What woody waste material is left behind is often concentrated into piles.

For mosses even small-scale differences in environmental conditions are likely to influence success. The topography of the soil surface may seem irrelevant to us, but to little living things the miniature mountains and valleys and their associated microclimate could mean the difference between a species colonizing a disturbed site and reproducing effectively, and not doing so — a harbinger of extinction. Hence, since some species may be strongly associated with conditions left by fire, we must ensure that the ecological footprints we leave behind reproduce these.

Mosses may be small, but their contribution to the boreal forest's natural history is not. Given their ubiquity on the coniferous forest floor, it is hard to image that they are not important for other animals and plants in this system. Yet, the mosses of Alberta's spruce forests have been understudied. Consequently the impacts of human disturbance upon one of the boreal ecosystem's dominant life forms are poorly understood. Human-mediated disturbances are increasingly eradicating and fragmenting the boreal forest. In our attempts to preserve this ecosystem we need to ensure that mosses are not ignored.



**Climate:
A Risk Factor to Health?**
by Justine Klaver

MSc Student,
Department of
Public Health Sciences,
Epidemiology Program

The Kyoto Protocol, an international agreement aiming to reduce carbon emission levels of participating nations, has focused on economic cost. The United States decided not to ratify the Protocol because it will hinder economic growth.

Furthermore, Alberta, Saskatchewan, and British Columbia have recently expressed concern over the Canada's commitment to reducing fossil fuel emissions. They have estimated that emission reduction could cost billions of dollars and result in the loss of thousands of jobs.

If correct, these estimates represent short-term costs. But what is the cost of not reducing GHG emissions or ratifying the Kyoto Protocol, especially, as it pertains to the health and well-being of Prairie populations, today and in generations to come?

What's Going on at the U of A, regarding Climate Change?

The Department of Public Health Sciences and Department of Earth and Atmospheric Sciences, has established a Prairie-wide network of researchers and stakeholders concerned with climate change and human health issues. This network pools resources and expertise in the field. In addition, funding is pending to continue climate change and human health research in the Prairie region.

