

Mammals as Agents of Tree Death

Peter Duinker, Halifax Tree Project, 2022-01-22

We might not readily think about mammals as organisms that kill trees – our usual inclination is to think about nasty insects and diseases. My experience with mammals and trees is largely in the context of rural woodland. However, all the mammals I will cover in this article are also implicated in urban and “near-urban” settings. Let’s start.

Moose (Alces alces americana and Alces alces andersoni)

In NS, we have two subspecies of moose – the “americana” subspecies that is considered native here (on the mainland only) and the “andersonii” subspecies that was transported to Cape Breton Highlands from Alberta in the late 1940s. The mainland subspecies has endangered status and is at very low densities in the few habitats in which they live. The western-Canada subspecies is at pretty high densities in the Highlands and can inflict untold damage to forests that are trying to regenerate after the spruce-budworm outbreak of the late 1970s and early 1980s. To be honest, moose ever so rarely venture into towns and cities, and I would not consider them a general urban nuisance. However, I have heard first-hand accounts of moose in Cape Breton venturing into town or onto farms and munching away on plants, including trees, they consider palatable. I have no photos of this, but below you’ll see a picture of a moose in the Highlands and an example of the damage moose can do to woodland trees.



Photo 1: Moose in the Highlands (Photo by Peter Duinker)



Photo 2: An example moose damage in woodland trees (Photo by Peter Duinker)

Beaver (*Castor canadensis*)

The beaver is another mammal we generally associate with rural woodlands. However, beavers frequently inhabit riparian zones and wetlands that are often plentiful in urban subdivisions where developers are instructed to avoid disturbing the wet areas. Beavers are effective habitat engineers that create expanded waterbodies behind their signature dams. Those dams, of course, are made of sticks that beavers seem to prefer to get fresh from trees they topple rather than deadwood that has fallen from the trees next to the dam site.

I have seen beaver activity in urban wetlands but never paid much attention to it. However, on a recent visit to Nelson, BC, I walked through a riverside park where trees planted quite some years ago still had trunk protectors on them. Here in Halifax, we use these trunk protectors on street trees mainly to prevent damage to the tender young trees from grass-mowing equipment. Our protectors are short and we aim to remove them once the trunk starts to fill the entire pipe. I learned from my host in Nelson that these protectors, being rather tall, are there to prevent beaver damage. As you can see in the second photo, sometimes the protectors aren't tall enough to prevent beaver damage. Luckily for the tree, the beaver seems to have given up and the tree clings to life.



Photo 3: Trunk protectors to prevent beaver damage in Nelson, BC (Photo by Peter Duinker)



Photo 4: Trunk protector in Nelson, BC - note that it was not tall enough to prevent beaver damage (Photo by Peter Duinker)

Snowshoe Hare (*Lepus americanus*)

I have yet to see hare damage to small trees in Halifax, so maybe it doesn't happen much (at least in the city centre where I live). But I have seen hare damage in the woods, particularly in Northern Sweden. In some of the northern, high-elevation ecosystems of that country, the tree vegetation is almost entirely birch. The photo below shows just how a voracious hare, atop the winter snow, can strip bark off the young birch trees and render them extremely vulnerable to mortality.



Photo 5: Bark stripped from a young birch tree by a hare in Northern Sweden (Photo by Peter Duinker)

Raccoon (*Procyon lotor*)

The raccoon is a ubiquitous pest in urban environments. Online videos abound wherein raccoons are prying into urban dwellers' possessions and outdoor bins and wreaking havoc. A raccoon has frequented my backyard but didn't seem to want to stay. I haven't seen raccoon damage to trees here in the city, but I certainly have in the woods. I recall seeing a copse of red pines near my previous home in Thunder Bay, about 30 years old, all killed from stem girdling midway up in the canopy by raccoons. When I was studying for my PhD in Fredericton in the 1980s, I recall hearing about (but never seeing!) company foresters who, when working deep in the woods, would carry a long gun to shoot raccoons when they were found munching on the bark of red-pine trees.

Squirrel (*Tamiasciurus hudsonicus*)

Squirrels also abound in our urban forests. I have not noticed tree damage due to squirrels but if you go online, you can find numerous photos of squirrel damage to trees, mostly bark removal (for example, see this article by colleague Andrew Millward - <http://spacing.ca/toronto/2007/09/15/field-notes-from-a-parched-city/>). That damage is especially hurtful to trees because the growing tissue of the trunks and branches is a very thin layer of cells known as cambium. The cambium sits directly under the bark, so its removal in a full circle around a tree's trunk (girdling) is a sure recipe for tree death. Just put "tree

damage by squirrels” into your internet search engine, click on “images”, and see what damage squirrels can do to trees.

Humans (*Homo sapiens*)

Yes, we are mammals, and yes, we too inflict damage on trees in ways that are sometimes like what non-human mammals do. Here is a sad example of what some hooligans did at a new skatepark in Copenhagen. They were annoyed by all the twig, leaf, and fruit droppings from a huge horse-chestnut tree at the edge of the skating surfaces, so, probably in the cover of darkness, they girdled the tree with an axe to try to kill it (see photo). They were successful.



Photo 6: Human-inflicted tree damage in Copenhagen (Photo by Peter Duinker)

White-tailed Deer (*Odocoileus virginianus*)

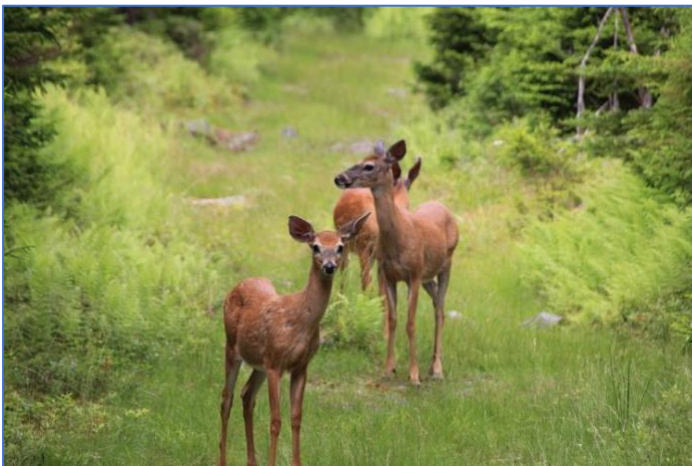


Photo 7: White-tailed Deer (Photo by Peter Duinker)

I intentionally left deer to the last because there is lots to say about deer and their impacts, and controls on their populations in urban areas are at the top of the news in many urban areas. Unfortunately, deer are too cute for many people not to care deeply about them, enjoying their presence in the urban landscape, feeding them occasionally or even regularly, and abhorring the thought that somebody might shoot a deer to try to reduce their urban population. Deer are both grazers and browsers, so they eat the succulent parts of any palatable plant – garden plants, grasses, shrubs, trees. I have witnessed deer damage so severe on the naturally regenerating seedlings in a woodland sugar-maple stand that regeneration of that tree species was impossible under the conditions of such high deer densities.

The most recent hot news about urban deer in Nova Scotia is the controversial plan in Truro for crossbow-outfitted hunters to kill twenty animals this winter. Some citizens want no such hunting to occur – they like the deer so close to home and are willing to put up with the damage to plants. Some badly want the cull to reduce the damage to plants, including newly planted trees. Some say the program won't work to reduce deer populations in town – when food is aplenty and populations temporarily low, deer populations will quickly recover through prolific reproduction.

This story is long and complicated so I won't belabour it here. Suffice to say that the deer-in-the-city problem won't go away any time soon, and if deer damage to valuable young trees is to be avoided, it is probably best to focus first on protecting the trees rather than terminating any deer. Near Glasgow in Scotland, a landfill reclamation project sought to turn the area into a woodland – that, though, required expensive tree-protection sleeves of a metre in height. That would deter all but the tallest mammal browsers, but my hosts on this tour assured me that this was an attempt to thwart deer browsing as well.



Photo 8: Tree-protection sleeves to deter deer browsing near Glasgow, Scotland (Photo by Peter Duinker)

Domestic Animals – Sheep, Goats, Cattle, Etc.

These animals are hardly relevant to a discussion about urban forests in a country like Canada, but there is an interesting interplay between rural and urban forest management in some European countries that I thought I might amuse readers with before concluding this article. In Britain and some (perhaps most?) of European continental countries, people were fond of culturing trees so that they would deliver small wood frequently during the life of a tree rather than huge logs at the end of the tree's life. The small wood was much easier for country folk to manage given the crudeness of their tools back in the day. The approach was to cut the trunk of a new tree when still rather small and then hope to get a suite of new shoots growing from whatever part of the tree was left attached to the roots. When the cut took place at ground level, it was called a coppice. When the cut took place a few metres from the ground, it was called a pollard.

Some species of broadleaf trees can be very successfully managed this way. Growth rates of coppice and pollard wood can be rapid because the tree, once the aerial portion is removed, is motivated to try to regain a shoot-to-root balance akin to what it had before the cut. So, it puts the bulk of its sugar resources, in the immediate term from those stored in the roots and later from photosynthesis, into crown development. In just a few years, perhaps a decade, the tree owner or land tenant could get another crop of small wood for fuel and various building projects around the farm. Then the cycle begins again, and it could go on for centuries depending on the species of trees involved.

If coppicing works, why did people choose to implement pollarding? Well, because both wild and domestic herbivores would have a field day with the new shoots emerging from a one- or two-year-old coppice. To prevent such herbivory, the stem was cut a few metres from the ground and the animals could no longer reach the tender new shoots. Clever tactic!

What is so interesting to me about coppice and pollard practices is that coppicing has not been taken up in urban-forest management but pollarding has. However, the reason to use pollarding is clearly not related to mammal herbivory. I can think of only two reasons to pollard city trees. One is to continue a long-time rural cultural practice, going back many centuries, and bring it into the city because people like the result. The other is to prevent trees from growing too tall so as to become increasingly prone to windthrow – the taller the tree, the greater the propensity to fall in a given wind event.

Whatever the reason, it makes for a strange aesthetic for a Canadian wandering through a city like Bordeaux, in southwestern France, where most of the urban forest is made up of London plane (*Platanus x acerifolia*). Many of the trees were pollarded at some point early in their lives in the city – some have been let go, and others continue to be pollarded. I have a hunch that the ecosystem services that depend on the density of tree foliage per unit ground area are much reduced in a routinely pollarded urban landscape as opposed to one where the tree crowns are full each year. Just consider the four Bordeaux landscapes I've pictured below with photos from winter 2013 – two actively pollarded, two with the pollards let to grow out.



Photo 9: Plane trees with pollards removed in Bordeaux, France (Photo by Peter Duinker)



Photo 10: Plane trees with pollards in Bordeaux, France (Photo by Peter Duinker)



Photo 11: Plane trees with pollards removed in Bordeaux, France (Photo by Peter Duinker)



Photo 12: Plane trees with pollards in Bordeaux, France (Photo by Peter Duinker)