

Old Growth Forests

A Fact Sheet on the State of Old Growth Forests in Nova Scotia

Nova Scotia Nature Trust

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There's a place deep in the heart of Victoria County, Cape Breton. It has a deep ravine, with huge hemlocks, white pine, and red spruce. They hang on to the sides of the ravine, their roots weaving into the bedrock.

The forest floor is thick with mosses, still moist even in mid-summer. There's a pair of hawks nesting in the ravine, though it is hard to get a clear view of them through the dense canopy and lush young growth. At the bottom of the ravine, a clear, cool brook flows over waterfalls and deep pools, brook trout lurking under overhangs.

Once, all of Nova Scotia was covered with variations of this pristine natural wilderness. That is, before the first settlers arrived and cleared the forests. There are very few places like this left, and what little remains is imperilled.



NOVA SCOTIA NATURE TRUST

What are Old Growth Forests ?

Old forests consist primarily of longer lived species that can survive well in shaded conditions, such as Sugar maple, Yellow birch, American beech, White pine, Red spruce, and Eastern hemlock. While large ancient trees are a major component of old forests, old forests also harbor a variety of trees of different sizes and ages. When old trees die and fall over, gaps are created in the forest canopy. Sunlight streams through these

newly created pockets down to the forest floor, enabling the regeneration of tree seedlings that have been struggling in the shade. This 'gap' formation is the major type of regeneration in the old forests of Nova Scotia. With the continual additions of young trees in gaps, old growth forests can live indefinitely. Over time, a multi-layered forest develops, with a variety of live, dying, and dead trees, and accumulations of large dead wood on the ground.

An old growth forest includes not only trees, but the intricate root systems of trees and other plants, the soil, mosses, lichens and other organisms living on the trees, and all the animals and plants that depend on the live and dead trees for feeding, raising young, hibernating, etc. All of these natural processes contribute to a healthy diverse forest that supports many different habitats for plants and animals.

Nova Scotia's Forests - then and now

Over the past 300 years, most of Nova Scotia has been logged and/or cleared for agriculture. Consequently, our forests are generally young, and lack many of the features of older forests. They are also a lot shorter than they once were. Prior to clearing and settlement by Europeans, massive white pines dominated the forests of this province, reaching heights of 30 metres (100 feet) in some places, even 45 metres (150 feet) in a few particularly fertile sites. If you consider that a one-story apartment is roughly 3 metres in height, 30 metres is equivalent to an apartment building ten-stories high! It's difficult to believe, but there were once pine trees in Nova

Scotia as high as a fifteen story apartment building. Table 1 indicates the size that many of our native trees can attain. Today, old growth forests (over 150 years old) are a rarity in Nova Scotia. In fact, less than 1% (0.6%) of our forests are over 100 years old. Most are found in small isolated stands that are not big enough for wildlife species requiring large areas of undisturbed forests, such as bears and martens. In some parts of the province the oldest forests we have are 80-100 years old, and may contain only a few scattered true old growth trees. Most of the forests we see today

are growing back from previous cuts or from land cleared for agriculture.



How old are old growth trees?

For many of our long-lived species, such as white pine, hemlock, and sugar maple, vigorous growth may continue for several hundred years, and only when this slows down, has the tree reached 'biological maturity'. Even then, the tree may continue growing for another 100-200 years. In the case of hemlock, the tree can be growing vigorously well past 400 years old. The table to the right compares typical ages of maturity observed by the forest industry, with the actual lifespan of many of Nova Scotia's tree species.

The point here is that 'mature' is a term with many different meanings and interpretations. For many landowners, a dead or dying, partly hollowed tree is hardly worth preserving. The same goes for dead trees lying on the ground. We often hear landowners say "I'm going to salvage what's left of the old stuff, take it out before it rots". There is a misconception that old wood is useless. This couldn't be further from the truth. (See the discussion on 'Dead wood - the life of the forest' for more details)

TREE AGES		
Tree Species	Ave. 'Mature' Age by Forest Industry	Actual Life Span
White Ash	60-80	100-200
American Beech	60-80	300-400
White Birch	60-70	120-150
Yellow Birch	70-90	150-250
Eastern Hemlock	100-140	300-800
Red Maple	50-80	100-150
Sugar Maple	100-120	300-400
Red Oak	70-90	200-350
Red Pine	60-70	200-250
White Pine	100-120	200-450
Black Spruce	70-90	200-250
Red Spruce	60-80	250-400
White Spruce	50-60	150-200

Why are old forests important?

Old growth forests provide a great variety of habitats that in turn support a wide array of organisms. Hundreds of animals and plants, from orchids, mosses and lichens, to insects, frogs, birds and mammals, depend on large trees and old forests to live. Consider, for example, the Calypso orchid, that grows best in old growth cedar stands, or the Northern goshawk, which nests almost exclusively in dense old-growth hardwoods or mixed growth. There are also many species that regularly use large dying and dead trees — standing and lying on the ground — for all or part of their existence.



Reduced Flooding

Another significant role of organic matter, such as dead wood, is the storage of water. Soil containing high levels of organic matter have a large capacity to store water, which both slows the movement of water during large rain storms, and acts as a reservoir during droughts. Similarly, large woody matter in streams and rivers stabilizes streambanks, prevents erosion, and significantly slows the passage of water through watersheds, all of which contribute to reduced flooding downstream. In the community of Middle River, Cape Breton, landowners in the river valley are very upset about increased flooding and resulting loss of land. They believe this is a direct consequence of clearcutting in the upper portion of the watershed.

Dead wood - the life of the forest

In the words of forest scientist Charles Elton, “dying and dead wood provides one of the two or three greatest resources for animal species in a natural forest...if fallen timber and slightly decayed trees are removed the whole system is gravely impoverished of perhaps more than one fifth of its wildlife component”.

Numerous wildlife species, plants and animals, depend on large dead or dying trees for their survival. Some species, like the now rare American marten and Fisher, depend on old growth, coniferous forests, especially large dead wood on the ground, for raising young and hunting. Bears also need large fallen trees for hibernating.

Other animals, like the barred owl, require large holes, or ‘cavities’, in standing trees. A ‘cavity’ tree is a dead or dying tree that has one or more holes on the trunk or main branches. Occasionally, cavities can be found in healthy trees. They are either excavated by birds, or created by decay and broken branches. For many birds and mammals, cavity trees are vital for nesting, rearing young, roosting, feeding, storing food, escaping and/or hunting predators, and hibernating.

More than 50 wildlife species in the Maritime provinces that use cavity trees. Some of these species require large cavities, and therefore even larger trees, like the rare and beautiful Wood duck, the insect-eating bats, and the endangered American marten. Other species, like the Black-capped chickadee, and the Red-backed vole, can make use of cavities in much smaller-sized trees. Woodpeckers play an essential role in creating cavities in dead and dying trees.

Fertilizers

If you like to hunt, fish, trap, hike or simply observe nature, leaving many, if not all, of those big old trees in the forest is your best option. If you’re a farmer or a woodlot owner who likes to cut timber, leaving large dead and dying trees will help your forest develop. Besides providing wildlife habitat, dead wood has many other important roles in the forest. Dead organic matter, in the form of trunks, limbs and branches, contains large amounts of nutrients and carbon, which are then slowly released during decomposition. In this way, dead wood acts as a slow-release fertilizer, and plays an important role in maintaining forest quality. According to renowned forester Chris Maser, ‘decaying wood serves as a savings account of soil organic materials and nutrients in forest ecosystems’.

Ecosystem Stability

In addition to providing wildlife habitat, old forests have many other roles, the most important of which may be the maintenance of a stable ecosystem. Daily, seasonal and extreme weather conditions are buffered by the presence of an established, stable forest that is diverse enough to be both resistant and resilient to outside influences, such as storms, insect attacks and drought. In fact, scientists across the continent have shown that old forests, especially large trees, have a huge influence on the stability and water quality of streams, rivers, and estuaries.

Big Trees & Salmon Habitat

Consider this: A small sugar maple takes hold on the side of a brook flowing through an old forest. Each year, the maple grows taller and extends its roots deeper into the soil. Each year, it shades the stream during the hot summer months, and in the fall, its leaves fall off into the stream, feeding thousands of stream insects. During the spring thaws, its network of roots stabilizes the banks, preventing erosion and the addition of silt into the gravels in the streambed. Each year this sugar maple gets bigger, casting more shade on the stream, and shedding more leaves in the autumn. This allows the young salmon to live in this brook, and spend their days fattening up on the thriving number of insects that are feeding on the leaves.

After 200 years or so, the maple slowly begins to die. Eventually a violent fall storm blows through the stream valley, toppling the maple into the brook. Streamwater courses over the trunk, digging out a pool just downstream from the trunk, and saturating the water with oxygen. This newly created deep pool, with its cool water, becomes a favorite place for the salmon to hide from predators, and to rest from the current. The clean, cool, oxygenated water of this brook is perfect for salmon. During the next spring thaw, the large firm maple trunk holds its place in the brook, and slows the rate of the gushing flood waters, further reducing the effects of erosion downstream. During this time, the deep pool provides a safe haven for young salmon hatching from eggs in the gravels below the pool. These salmon simply will not thrive in silty, warm, poorly oxygenated streams and rivers.



Photo: Harry Brennan

Owls & Old Forests

Twenty-five years ago, Bernard Forsythe, a postman from the Gaspereau valley, noticed many barred owls in the woods, but couldn't find any sign of nesting, despite the abundance of meadow voles and short-tailed shrews, their favorite food. He did a bit of reading, and found out that the owls nest in big trees - trees with large cavities that can house an adult owl and its young. He realized that the owls couldn't nest and reproduce because big trees were scarce in the Valley. His solution? He built 20 nest boxes, and

attached them to trees. Sure enough, the next year there was not a single vacancy! The barred owls - and a few other animals as well - moved into the boxes, and have been nesting in them ever since. One female barred owl has been returning to the same box for 16 years! Had the early settlers left some big trees, this situation would not have arisen, and the owls would not be depending on Mr. Forsythe for a place to nest. The fact is, we cannot possibly replace all the habitat provided by old forests.

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