



New York
Times
Best Seller

FINDING THE MOTHER TREE

Discovering the
Wisdom of the Forest

SUZANNE SIMARD

Mother Trees

How a researcher tapped into the wisdom of the forest communities – and helped change forest management strategies.

By J. Morton Galetto, CU Maurice River

The first time I visited the primeval forest of Bear Swamp (Commercial Township) was back in the late 80s. My husband and I went in on a cloudy day without a compass. We saw huge old growth trees and marveled at what we thought was a magnolia. An old forest somehow has a magical effect on people. But without the presence of the sun or a compass we got lost in the magic, and our joy turned to a bit of mild panic. We navigated our way out by following the back-up beepers from a sand plant's front-end loaders. From there we walked a railroad right-of-way back to our car.

Later in 2007 I returned to a different section in Downe Township with Steve Eisenhauer, of Natural Lands. There we saw giant trees, many of which were in their final century of life. Snow and wind had destroyed much of their crowns but they were still omnipresent and stately in their haggard elegance and, as I would soon learn, more beneficial than first presumed.



On a walk in Bear Swamp, Downe Township, lead by Natural Lands a hiker climbs into the huge hollow of a fallen tree. This dead tree will support fungal decomposition.

Whenever we sponsor a giant tree walk with CU Maurice River members it fills to capacity a short time after being announced. When we are on the trail and we see a massive tree it's rare not to have a group of people immediately eager to encircle it. So when Suzanne Simard, Professor of Forest Ecology at the University of British Columbia, wrote and released "Finding The Mother Tree," it seemed likely to me that it would be popular. She had given TED Talks and been interviewed many times after she published a study in the journal Nature. In fact James Cameron's mystical film *Avatar* was inspired by her work. And more recently the best seller, "Overstory," loosely based one of its fictional characters on her work.

I thought that "Finding the Mother Tree" would be well-received but I hardly expected it to become a NY Times bestseller. However, people feel connected to trees. Surely there is something in our psyche, dare I say, that links us to trees and forests. Surely there is a plethora of reasons for us to feel logically conjoined. Our homes and so much of what is in our homes is created from trees. Our ancestors warmed themselves with fires and cooled themselves in their shade. Our vessels were made - and many still are - from wood. A number of our medicines derive from trees. And trees also sequester carbon, releasing clean air and adding moisture to the atmosphere.

Many more people than you might guess are willing to admit a spiritual connection to trees. In fact many societies have an epistemology that is

grounded in them. Poets, photographers, and artists clearly hold our leafy companions in great regard. Some of our most treasured poems, novels, and stories are tree-themed. And think about people's reactions to trees, especially to large trees being felled. Visitors flock to national forests that have behemoth stately trees or autumn leaves. Wildlife watching and trees are virtually synonymous.

I'm going to accept that I'm preaching to the choir, accept that you know of the virtues of trees, and focus on Simard's book and her conclusions. Although I didn't expect her exposition to be intertwined with her life rather than being only about her discoveries, the associations she makes help the reader to connect more easily with her ideas and findings.

Simard grew up in a lumbering family in British Columbia where trees and the harvesting of trees rule. Her grandfather had a log flume on the sides of the mountain and the family wrestled with the dangers of moving trees via booms on Lake Mabel, British Columbia, Canada. They balanced on springboards to fell huge giants, like western white pines that would take two men two days to cut through. It was strenuous and dangerous work, the kind of work that builds respect for a forest. These trees were cut with manpower and harvesting was selective as opposed to clearcuts.

It was in Simard's blood to become a forester. However, during the later years of obtaining her forestry degree she became disenchanted with the massive modern-day operations, primarily

because of the “agency policies” that were *free-to-grow*. Free-to-grow viewed the forest complex as involving competition rather than cooperation. So lumbering operations would clear-cut forests and then agencies would require them to replant.

At face value this would seem wise and warranted, but the devil is in the details. Since trees were thought to compete for space and nutrients, a monoculture of the most desired varieties was planted. And to guarantee that monoculture, a herbicide developed in the early 1970s, Roundup (glyphosate), was used to kill any herbaceous competitors before planting the replacement forest. It was assumed that trees would grow more swiftly, to be harvested again in 100 years, without any competition. This was considered to be a well-managed forest.

Simard’s internships with a logging company gave her the job of checking clear-cuts and reporting back on the health of the new monoculture forest. Her findings were dismal: a large percent of the new trees were sickly, or worse yet, dead.

She suspected that trees had an interdependence and that this interdependence was linked to mycorrhizal fungus, and she devoted her life to making discoveries around this concept. Botanists before her recognized that plants were in a life-and-death interchange with fungus: a mutualism, with each relying on the other for an exchange of nutrients. Yes, some fungus is detrimental, but many have a beneficial and essential connection.

The reader follows Simard's discovery process when she first pulled up saplings, and found networks of fungal threads on the roots of trees that were doing better than those without these thread-like structures - hyphal branches. She began to study the fine details of these hyphal links; most are microscopic. And she suspected that they were integral to successful growth in a forest.

Foresters presumed that birches were a drain on the more financially-desirable Douglas fir, increasing their investment in monoculture over mixed forests. Simard saw these reforested plots as failing.

As her life and professions evolved she was able to do more to test her theories, especially after she joined the academic world. She set up test plots of monoculture vs. three mixed species. By using carbon-13 and carbon-12 tracers she demonstrated that the birches and firs were exchanging nutrients, and that in different seasons the one was more reliant on the other. She equated this to communication, and considered that ultimately the fungal threads were the main vehicle of exchange. She also contended that over the long term the overall wood output of a mixed forest exceeded the output of a monoculture. Agency people pushed back, but in time her studies and theories gained the respect of many foresters.

Simard's theories flew in the face of accepted forestry practices that saw different species as

competing, not complementing and cooperating as her studies indicated. As research evolved it was revealed that there was a critical chemical exchange of nutrients and carbon provided by larger trees to saplings. Young trees lack the canopy that creates the carbon sink necessary to sustain a robust life independent of a mature tree's assistance. And in fact the large trees, called *Mother Trees* by Simard, nurtured not only their kin but other trees and other species as well. A complex forest was a healthier forest.



Author's grand niece hugs a Douglas fir – clearly a Mother Tree – in the Pacific Northwest, Land of the Giants Loop Trail, Federation State Forest, Enumclaw, Washington.

Habitat considerations are paramount here as well. The diversity of fauna species supported by a mixed forest, compared to a monoculture, is staggeringly larger. Further the mixture of understory and overstory species is necessary for diverse species use.

Mother Trees also have the deep root systems that help manage drought and redistribute not only carbon but moisture. Through the connection of their roots and the hyphal link/network, the largest trees help maintain the health of the younger trees – forming a community.

Policymakers began to revise their regeneration policy, reducing herbicide spraying by half. Simard's work drove much of this change.

Throughout her book Simard makes observations about the similarities between humans and forests. For example: "...a cubic foot of soil is packed with a hundred miles of mycelium. A web of life like our own cardiovascular system of arteries, veins, and capillaries." What we can readily see is the reproductive part of fungus – mushrooms filled with spores - but the organism is much larger beneath the ground.

When diagramming the forest's *Mother Trees* and their kin, Simard makes analogies between the construction of our brain functions - our neurons

and synapses - and the mycelium network of the forest, with the *Mother Trees* being the neurons and the chemical signals and exchanges through mycelium being the synapses. People use amino acids and proteins for brain functions, and plants use these to communicate. Arguably a forest's chemical exchanges may just be a different type of thought process.

Simard's descriptions of her family and her analogies to humans maintain the non-scientist's attention, as well as being interesting to the scientist. While I've summarized an already very condensed version of her life and life's work into a few brief paragraphs, the book is as well worth reading as her Ted Talks on YouTube are fascinating to watch. Take a look!



Authors grand nieces in spruce cavity, Olympic National Park.