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Quick, Timely Reads

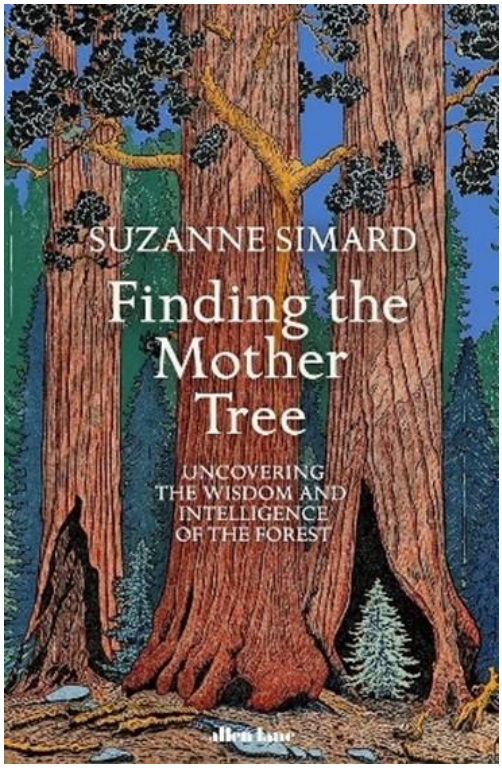
On the Waterfront

'Finding The Mother Tree'

The Stunning Research of Suzanne Simard

By David Frew, Scholar in Residence

December 2023



Dr. Suzanne Simard's 2022 book outlines her life and work.

Last in a Series

I love trees. Part of my fascination with Presque Isle has been the impact of the succession process that has formed it, as well as the other sand spits that have helped to define Lake Erie. And trees are the essential ingredient in Presque Isle's succession. The relentless process of succession can be observed as a sequence of changing species on Presque Isle, Long Point, Ronreau, Pelee, and Sandusky (Lake Erie's five major sand spits) and the signature tree that drives the process is the eastern cottonwood, a tree that is often undervalued by those who do not appreciate its role in anchoring places like "our peninsula." According to Simard, cottonwoods, like other tree species, are members of communities, which communicate with and support each other as they grow and develop. The story of Simard's discovery of this amazing reality is presented in her 2022 book, "Finding the Mother Tree."

I was drawn to Simard's work after reading several less scientific books about the ways that trees communicate with each other. She takes tree communication to a new level by adding the vision of a traditionally trained academic. Not only is she a disciplined academic researcher but she is a forester who grew up in the northwestern forests of Canada in a family that worked in the business of logging. Her career has bridged the growth of the forest industry, spanning the early days

when foresters were mostly small, individual operators who have been replaced by huge corporate-industrial giants.

As a child whose family was engaged in cutting and selling trees (like many small famers in North America), she recalls errors that were made by her family and other small operators but knows that her father and grandfather had a basic understanding of tree growth systems and notes that they avoided the common modern practice of clearcutting. Forestry, like many other industries, has industrialized as it has matured, and that trend has put forests and the Earth itself at risk. According to Simard, climate change and the current carbon crisis are being exacerbated by the industrialized clearcutting of forests. While we tend to think of that problem as being focused on impoverished areas of the world such as South America, Canada is currently clearcutting forests at the unsustainable rate of almost 3 percent per year.

The book combines the story of Simard's life, which is an enjoyable and easy to read narrative, with a challenging scientific discussion about how forests actually work. As a child, her life was fundamentally altered when the family dog managed to fall into the bottom of the outhouse, where he became trapped in the unimaginable muck below. During the daylong rescue, Suzanne climbed down into the bowels of the pit to tend to the dog by providing water and loving care for the distressed pooch. That was when she first noticed the astonishing array of roots and other biological "stuff" growing through the walls of the outhouse pit. That vision helped her to visualize the astonishing reality of forests. There was (and is) as much going on beneath the forest floor as there is above it.

Suzanne Simard's father and grandfather intuitively understood the importance of the root systems to the forests where they felled the trees they would later sell. Since it was clear to them that the largest trees were responsible for the most extensive root systems, they avoided cutting those trees. Even though they could have been the most profitable they often cut round them, allowing the largest trees to remain, reasoning that their root systems would allow the remaining trees to thrive. They, like other small independent foresters, worked in species-diverse forests, cutting a variety of types of trees and avoiding the temptation to fell only the most profitable species.

As the Simards and other small family foresters in the Canadian Northwest watched, giant industrial logging companies took over. In many cases they began purchasing large tracts of forest and systematically moved through their acquired land cutting down everything, much like a homeowner would approach mowing a lawn. There was no attempt to save the largest trees and their root systems. Instead, the new factory clearcutters, who intended to reforest the places that they had denuded, planted new trees in orderly rows. And instead of planting a variety of species to copy the original forest diversity, the new plantings were of single

species. The factory foresters planted the species that would predictably bring the highest possible profits at the time of their maturity.

Dr. Suzanne Simard, forest ecologist

Simard's passion for forestry drove her to academia and she earned a Ph.D. in forest science at Oregon State University. She took her degree back to the Northwest, first to a position as a research scientist at the British Columbia Ministry of Forests (a rough equivalent of the DCNR at Erie's Presque Isle State Park) and then as a faculty member and researcher at the University of British Columbia.

At UBC, she has worked hard to demonstrate the best methods for preserving and restoring North American forests. She began with laboratory work and then moved into the field where her experiments were complicated by interactions with grizzly bears and the other constant realities of life in the Northwest. Simard has been able to demonstrate the efficacy of wisdom that she learned from her family and observations that she made as a child.

Trees communicate with each other. The largest hub trees – she calls them mother trees – nurture and care for other trees, helping them to grow and thrive. Clearcutting and replacing native forest with single species plantations are dysfunctional practices. She is not an enemy of the forest industry but a hopeful

partner who would help big companies to do well while creating a sustainable environment.

Her cleverly designed laboratory experiments and field experiments have measured the transfer of infused carbon isotopes through root systems and between trees to calculate the systems by which trees communicate. Her research has demonstrated that “Mother Trees,” which are the tallest, largest, and oldest in a forest grouping, receive the most sunshine, thus sugar energy, and that they freely share this gift with other trees though underground root systems.They send distressed younger trees extra carbon, sugar, or water when needed. They communicate early warnings of insect attacks and help prevent diseases. They adjust their own root systems to make space for younger and growing trees. They serve as guardians of the under-forest through underground root systems. Interestingly, they favor other trees that are their own offspring (and of the own species) but also freely share nutrients with other species.

Her research suggests that instead of competing for sunlight, members of forest systems learn to “share the light” and its benefits through sub forest floor root systems.

One of her most powerful lessons to the new generation of giant industrial foresters is plant diversity. In addition to preserving the largest of existing trees (and their extensive underground root systems) rather than clearcutting, the practice of planting symmetrical rows of one-species trees simply does not work. These plantings have consistently failed to thrive, resulting in large patches of scorched earth where healthy and diverse forest once existed. Not only is this a threat to the Earth and an accelerator of global warming but it is counterproductive to the profit motive of the corporate foresters who have been trying to re-plant previously clearcut areas.

Many of these corporate giants publicly brag about their environmental responsibility in replanting cleared areas of forests. They produce PR releases proclaiming their efforts to replant North America’s beautiful forests by planting more trees than they harvest. What they fail to show, however, are the hundreds of thousands of acres of failed or failing tree sapling plantations. The single-species plantations seemed like a logical solution in theory, but they have not worked. Meanwhile, climate change advances.

This lesson was reinforced during Jefferson’s Global Summit XV speaker series by writer Bryan Freedman, who was discussing contemporary issues in the wine industry. After noting the massive impact of climate change on the wine industry, he commented on shifts in best practices with respect to vineyard planting. The traditional vision of neatly ordered rows of grape vines, stretching as far as the eye can see toward the horizon has been replaced by an apparently disorderly sight. Modern growers have learned that agricultural diversity is critical to

vineyard production, and they are now encouraging a variety of other plants to grow between and around rows of grape vines. The diversity of plants and critters near the vines reduces the requirement for fertilizers and works to the benefit of the grapes.

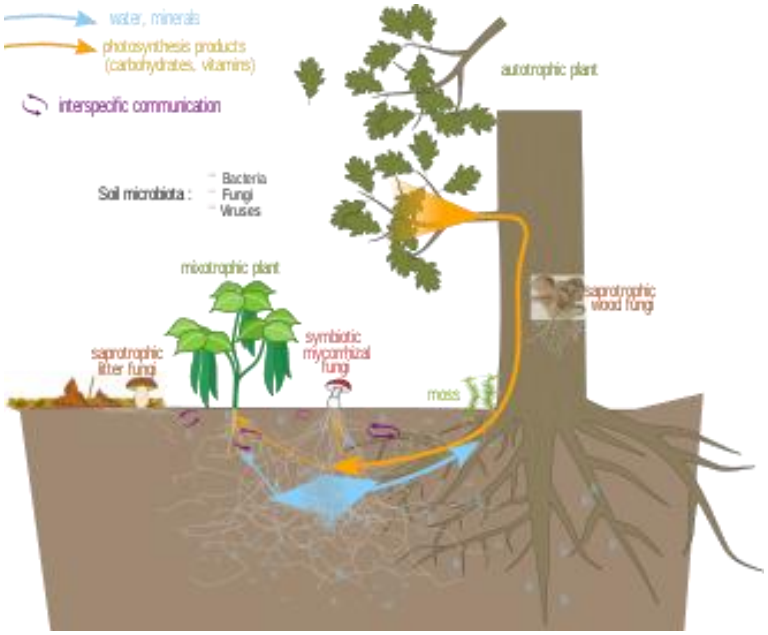


Illustration of mycorrhizal networks

Admittedly, the botany portion of Simard's book, unlike the life story narrative, is somewhat challenging. For readers who, like me, do not regularly find themselves thinking about mycorrhizal networks, fungi, and mycelial structures, the new language requires a bit of patience. But the effort is more than worthwhile. And a few new botanical terms can help in developing an appreciation for the things that we will encounter on walks at Presque Isle.

These days I find myself looking carefully at stands of trees and wondering: "Which is the mother tree?" Especially during my time on Presque Isle.

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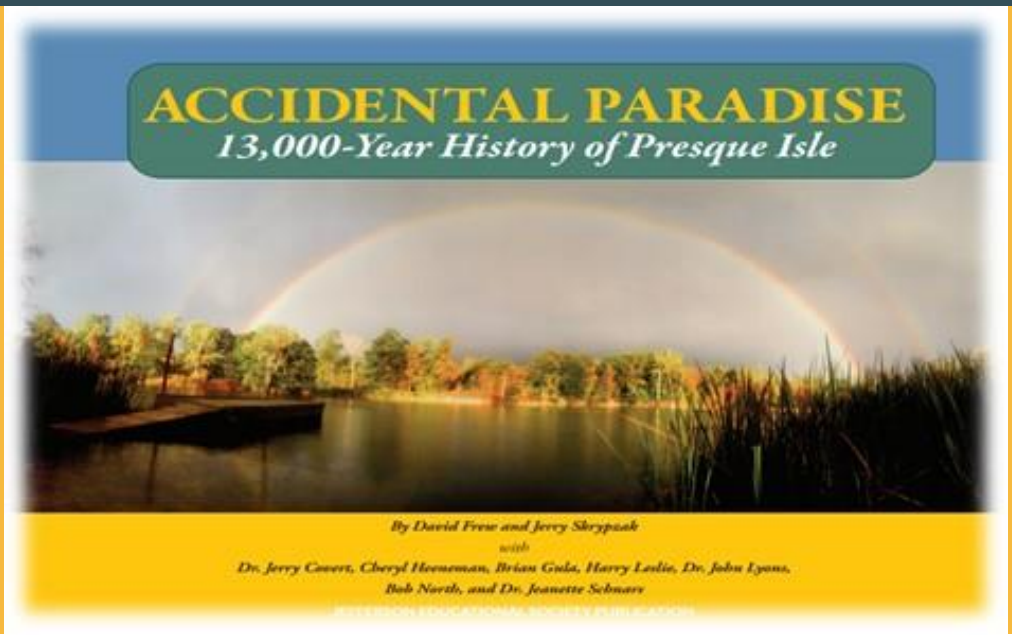
Accidental Paradise
by Dr. David Frew and Jerry Skrypzak



The beautiful book on Presque Isle published by authors David Frew and Jerry Skrypzak – "**Accidental Paradise: 13,000-Year History of Presque Isle**" – is on sale at the Tom Ridge Environmental Center's gift shop and through a special website, AccidentalParadise.com.

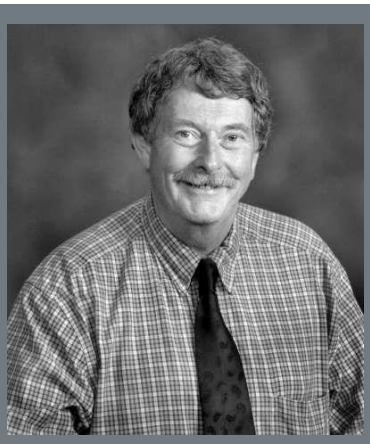
The book, priced at **$35 plus tax and shipping**, can be ordered now through the website sponsored by the TREC Foundation, AccidentalParadise.com.

Presque Isle Gallery and Gifts on the main floor of TREC, located at **301 Peninsula Drive, Suite #2, Erie, PA 16505** will also handle sales ***daily from 10 a.m. to 4 p.m.***

For more information, send an email to **aperino@TRECF.org**.

To watch "Accidental Paradise: Stories Behind The Stories" click here.

ABOUT THE AUTHOR



Historian and author David Frew, Ph.D., is a Scholar-in-Residence at the JES. An emeritus professor at Gannon University, he held a variety of administrative positions during a 33-year career. He is also emeritus director of the Erie County Historical Society/Hagen History Center and is president of his own management consulting business. Frew has written or co-written 35 books and more than 100 articles, cases, and papers.

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