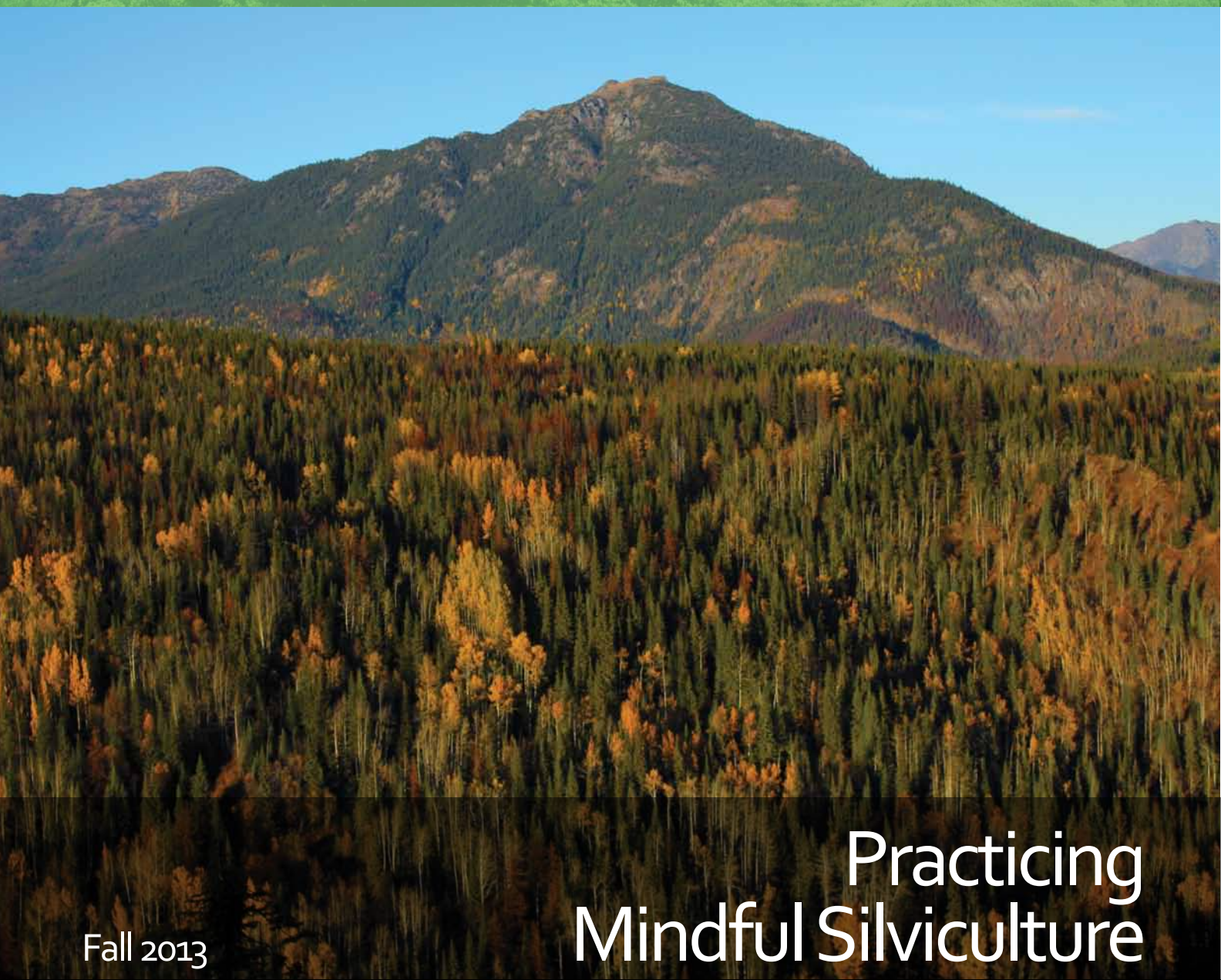
Silviculture
MAGAZINE



Fall 2013

Practicing Mindful Silviculture

The Importance of a Land Ethic

Forests and Their Soils are Twice as Important as Carbon Sinks

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Publisher Kate Menzies
Designer Krysta Furioso
Editor Dirk Brinkman

Silviculture Magazine
601 East Pender St., Vancouver, BC. V6A 1V6
Phone 778 882 9156 | Fax 604-628-0304
Email info@silviculturemagazine.com
www.silviculturemagazine.com

Notes from the Field

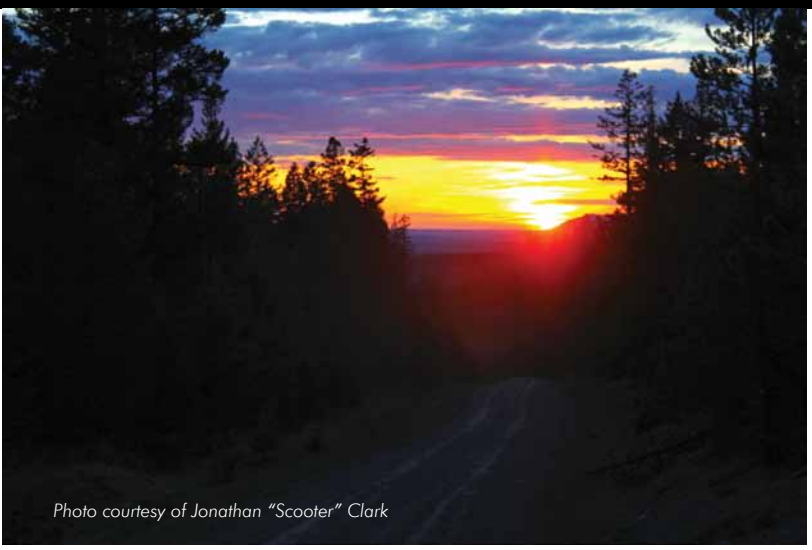

Photo courtesy of Jonathan "Scooter" Clark

A Whirlwind Tour of Western Canada

By Jonathan "Scooter" Clark

For many people, October means crisp fall days and explosions of colour among many of our favourite deciduous species. For reforestation contractors in British Columbia, it also means "viewing season," as the provincial government, through the Ministry of Forests and BCTS, releases contracts for tender for the following spring and summer planting seasons.

For the past few fall seasons, I've been involved in that process, and it has quickly become my favourite time of year. In a five to six week stretch, I'll travel all over BC (and probably a bit in Alberta too), driving approximately twenty-five thousand kilometres, and probably going through at least five oil changes and five or six flat tires in the process. Many of these kilometres are on gravel logging roads. I'll look at trees on at least twenty separate contracts, with hundreds of blocks totalling around thirty million trees. To say that it is an exhausting tour would be an understatement, but it's also incredibly interesting. I'll visit about 95% of the blocks on each contract, although I'm sometimes limited by time constraints, especially when access isn't possible by truck, or when dusk hits before I finish looking at an area, or when the snow comes early.

When I get to each block, my first task is to determine what time of year the block will be planted, because that will influence many other factors that I'll be assessing. I'll also look at the size of the block (bigger is better) and whether or not there are other blocks very close at hand, in case a crew needs to be split up to give everyone a full day of work without the dreaded mid-day move.

There are over thirty factors that I'll think about, albeit in rapid-fire succession. Most importantly, I think about access. Can we get to the block by truck, and if so, in 2WD or 4WD? What about access on the block – truck or quad to each area? And if the trucks can't make it to the edge of the block, what are the alternatives? Using quads is the most common backup plan when the trucks can't make it, followed by helicopter. Side-by-sides are coming into increasing use, and on rare occasions, we might use less common vehicles such as Argos, rolligons, track machines, or even hovercraft (these are more common in Alberta than in BC) or barges (commonly used on the Coast). Access by foot is sometimes a necessary evil. Travel time is important, so I need to figure out surface driving time (in a lumbering crummy or loaded FIST) from the approximate camp/motel location.

Next, I'll look at several groups of characteristics. The first might be called the Geography Group. The average altitude affects when the snow should be melted and the ground thawed. The altitude range is important because bigger differences from low to high ground increase the chance of seedlot complexity. The aspect also matters for snow melt and the slope affects production numbers. The ratio of block size to approximate total road length on the block is important, because more roadside means more "easy" places to set up caches.

Next is the Surface Group. What is the slash load like? How was the block processed and/or cleaned up? How much coarse debris or litter is on the surface? How green will the block be at the time of planting and what types of vegetation exist? Is there moss, and if so, it is feather moss (potentially an issue) or spaghnum (which we can plant into)? Different species (alder, twinberry, fireweed, devil's club, lab tea, or grasses) cause variations in difficulty. What time of year was the block harvested? A winter harvest means vegetation might have been protected by snow, and thus could be more prevalent & resilient.

Next up is the Soils Group. Is there a lot of rock? If so, what kind (cobble, stones, slate, or other types)? Is there a lot of soil, or mostly black organics? If soil, is it red/brown mineral, or powder gray, or heavy in clay content? Is there any sand? Is the soil well-drained, or will it hold a lot of moisture?

As for Planting Specs, what does the forester recommend for target density, and minimum intra-tree distance? How many species are there, and in what ratios? Do the planters need to plant "tea-bag" fertilizer packs with each tree, or add cones or stakes? What kind of quality checking system is used? What kind of faults might be expected to be problematic in this particular area? What species and stock sizes have been prescribed?

The time of year that a contract will be planted is also important. Trees that need to be planted in June will go at a higher bid

price, because there is too much May and June work and not enough labour supply. Planting companies often bid more aggressively for July trees, as they try to chase a small volume of work to keep their work force going for a longer season.

As you can see, contractors don't just drive up to the block, stare at it while chewing a piece of jerky, and pull a number out of thin air. Before I leave each block, I'll rapidly scribble notes on the back of the block map, take a few photos and perhaps some video, and add it to the files that need to go back to the office. There, the owners will study all of my notes, look at the photos, determine prices, and put together the official bid package.

It sounds like a lot of work, but most people who work in forestry appreciate the sometimes-too-rare opportunities to see some beautiful scenery, hike up and down mountains, and enjoy Canada's beautiful outdoors. After all, there is beauty in the clear-cut.

Jonathan "Scooter" Clark has worked as a tree planter and/or supervisor at approximately fifteen western Canadian reforestation contractors over the past few two decades, and is the administrator of the Replant.ca website. Check out some of his photos from previous Fall viewing seasons at www.replant.ca/photos

Pines

By Matt Coté

It's the hot smell of dirt that gets me most.
The snot in my nose bonding to rock dust and building a cast.
Sometimes I think I could puke from the feeling of my nostrils closing in.
Next comes the feeling of it in my throat as it cracks too.
My brow is a ledge for sweat, my clothes permeated with salt and moisture.
Water escapes everywhere, indifferent, not pausing to clean me off on its journey away from me.
It only leaves a sticky mat of fabric and human mud as my suit for the day.
I'll drink more, every hour or so, to keep up the dress.
The sun's tacky glow, fixed on me, feels like finger nails across my neck and forehead.
Then come the bugs.
They need their share too, I guess. But right now I wish them gone with the dinosaurs.
The slow churn of diesel in the background, promising a civil retreat when the work is done
—the safe feeling of tomorrow's distance resonating through five o'clock bench seats.
On other days it's the rain, and wicking sleeves that press hard against me.
The cold handshake of the ground as I put my palm in it, always feels begrudging.
For nine hours at a time, I fasten trees to the ground, no matter what.
And because all I can do next is step away and then do it again—that's what I do.
I'll leave behind me a forest, and hope it suffers less the torment of what it took to put it here than I have.
Of my heat, my heart, my hands, back, and feet—I have given it my youth.
That it might grow to see something more than only my return, eighty years from now, with saw in hand, I have dreamed.
For I made it, and in doing so, often forget that it made me first.

Practicing Mindful Silviculture in our Changing Climate

By Suzanne W. Simard

Fungal networks interact with other organisms such as moss, trees, cavity nesters and people to drive energy flow across a hierarchy of meta-networks, resulting in self-organization of forest ecosystems. Photo courtesy of Bill Heath www.billheath.zenfolio.com

As silviculturalists, you and I are healers of the forest. At no other time in history have our knowledge, understanding and deep spiritual connection with the forest been more crucial for the well-being of this incredible place where we all live, this place we call *Earth*. As physicians do for humanity, we silviculturalists have a professional code of ethics (sensu Hippocratic Oath), and for most of us, a deeply personal commitment for the care for our forests so they are healthy, productive and resilient. We commit to this care while also delivering goods and services to society. The culture of the forest, or *silviculture*, is the most effective, creative and hopeful tool that humanity has for healing forest degradation and for mitigating and adapting to climate change (given that forests cover one-third of the *Earth*'s lands and affect all of the *Earth*'s systems). Society depends faithfully on us to practice successfully (to conserve forest function); our best performance is required. To be successful requires that silviculturalists are mindful of their intentions, the ecology of the forests, and how our practices affect whole systems. It requires that we maintain a deep spiritual connection to the forest, especially as that connection is challenged by human migration out of forests and into cities, and by the stresses of biodiversity loss and climate change. It requires that we remain open to new ideas, embrace uncertainty, and be ready to transform our practices to meet shifting societal goals and environmental conditions. The objective of this essay is to discuss a theory of mindful silviculture practice that honors the character of forests as complex adaptive systems. I use recent research on meta-networks to illustrate what complexity means. I follow with examples of mindful silviculture practices. I hope you find this essay inspiring, encouraging and helpful.

We all know that mindfulness is about being thoughtful, considerate and aware. But even more so, it is the avoidance of preconceived ideas that come with rigidity resulting from the strong filters and constraints on our perceptions of the world (Langer 1997). By keeping our minds open in this way, we are creative, conscientious and intentional in our actions (Siegel 2010). In the practice of silviculture, this means integrating observation, learning, knowledge, understanding and monitoring to make holistic management decisions in an uncertain environment. It means practicing silviculture with our minds rather

than our guidebooks or institutional memes. It is similar to adaptive management in that it is based on a learning process to improve management outcomes. However, practicing mindful silviculture also requires intentional and holistic integration of the socio-ecological-economic system so that it remains adaptive and harmonious in its functioning. Mindful silviculture is responsive to uncertainty, working with it for the flexibility and diversity it brings rather than reducing it for short-term outcomes.

Like our minds and our societies, forests are complex adaptive systems (CAS) (Levin, 2005). Embracing the CAS concept has the potential to transform natural resource management from being simplistic to holistic (Messier et al. 2013), as it has for approaches to medicine, social and business organization, and information technology (Siegel 2010). Perhaps the easiest way to understand CAS is as a metaphor for understanding organizational behaviour – think, for example, of how your community or workplace functions. In CAS, low-level interactions among the parts or agents that make up the system (e.g., people) are fundamental to emergence of high-level order, or self-organization (e.g., functioning of the community or business). The properties of business organizations (e.g., performance, social responsibility, work-leisure balance) emerge from the interactions among people (e.g., interpersonal relationships) in the workplace and with their communities. We see in forest institutions, for example, that the essence of our greatest success is what individuals do and how they relate to each other, not what executives plan or policy makers enact. Our industry thrives on our professional ability to integrate social, economic and ecological values, and to be adaptive and harmonious rather than governed by rigid rules or chaotic markets.

Similarly, the interactions and interconnectedness of the parts and processes in forest ecosystems underlie their nature as CAS. The parts – the organisms, species, guilds – interact in networks across different genetic, trophic, spatial and temporal scales, and the relationships and feedbacks across these various scales create structure, cohesion and emergent properties (Lau et al. 2010). System memory, or the past structures and events (e.g., genes in seed-banks or old trees, nutrient and carbon capital, snags or coarse woody debris left from a previous disturbance, perennial mycorrhizal networks, or migratory bird occupation) and environmental variability (e.g., climate driven disturbances) are also important features of forests as CAS because they create and maintain diversity, productivity and system dynamics (Anand et al. 2010). Specifically, mycorrhizal networks form when the hyphae of mycorrhizas (literally 'fungus-root' symbioses) link together two or more plants of the same or different species. These function in (for example) the colonization of trees and plants, the uptake and transfer nutrients and water, communication among plants and other soil organisms via biochemical signals, the storage of carbon, and the stabilization of forest ecosystems (Simard et al. 2012).

Meta-networks are comprised of several nested, interacting network components, a concept that is useful for understanding cross-scale interactions in forest ecosystems. In forests, meta-networks can involve small-scale networks of mycorrhizal fungal species with specific niches in nutrient and water acquisition, which are nested within larger-scale networks of trees physically linked belowground through mycorrhizal fungi for community level cycling of water or nutrients, which in turn are nested within even larger-scale networks of interconnected forests, grasslands and riparian areas interacting through dispersal and energy fluxes, which are further nested within contiguous watersheds interacting through migrations and disturbance, and so on (Simard et al. 2013). These ecological networks also interact with social networks, where humanity lives in, relies on and cares for forests in community, institutional and global networks operating across a multitude of social scales. Organization in meta-networks can result from interactions through any of the nodes (e.g., fungi, trees, watersheds, community forests, countries) or links (e.g., energy and information fluxes, social learning, international agreements), and these interactions inform the whole system.

Meta-networks can be considered agents of self-organization because they provide avenues for cross-scale interactions and feedbacks from which emerge structure and function in CAS (Parrott 2010). From mediating nutrient, water and carbon fluxes, for example, mycorrhizal networks are foundational to the growth of trees and storage of carbon, which in turn drive the energetics of forest ecosystems. In addition to self-organization and emergence, the properties and processes of meta-networks integrate with other key properties and processes of CAS, including openness, uncertainty, adaptability, heterogeneity, diversity, hierarchy, non-linearity, memory,

and sensitivity to initial conditions. When we isolate, manipulate or remove one of the key parts, networks or processes, we find that the effect ripples through the system to affect the other parts, networks and processes, often with unintended consequences. Disrupting network links by reducing the diversity of mycorrhizal fungi, for example, can reduce tree seedling survivorship or growth (Teste et al. 2009, Bingham and Simard 2012), ultimately affecting recruitment of old-growth trees that provide habitat for cavity nesting birds and mammals, and thus dispersed seed for future generations of trees (Edworthy and Martin 2013). Suppression of fire, high-grade logging, or removal of snags or coarse woody debris may also ultimately increase disturbance severity and reduce trees or tree-supported resource persistence that are prime sources of cavities (Drever *et al*. 2008). These changes can have direct consequences for human communities that depend on healthy forests for their socio-economic well-being. Conserving complex adaptive forest ecosystems, therefore, appears dependent on maintaining the diversity of its parts and processes, and the multiplicity of its interactions (Pimm 1984).

Disrupting mycorrhizal networks has had dramatic consequences for many forests. In southeast China, researchers recently discovered that absence of an appropriate soil microbial community was a key factor underlying mortality of the critically endangered tree species, *Euryodendrom excelsum*, and inoculation with mycorrhizal fungi increased survival rates of planted seedlings from 46 to 80% (Shen and Wang 2011). Similarly, in New Zealand, inoculation of *Pseudostuga menziesii* with ectomycorrhizal fungi native to North American habitat was pivotal in its success as an introduced species (Chu-Chou and Grace 1981). In British Columbia, the climatic envelope of interior Douglas-fir is projected to migrate northward and upward in the next century (Wang et al. 2012). At the same time, the current interior Douglas-fir forests are expected to undergo dramatic changes as regional climates become drier or wetter, hotter or cooler. We do not know whether the mycorrhizal fungi will migrate along with their host, and without an appropriate web of fungi to help the establishment of seedlings, forest may not recover from disturbance or migrate to new locations where climate becomes hospitable for them. By understanding the obligate role of mycorrhizal fungi in these forests, we can design creative forest practices that help the forests adapt and thrive in an uncertain climate. These practices could include, for example, retention of legacy trees, plants and soils, encouragement of natural regeneration along with planting, protection of dispersal agents, or assisted soil mycorrhizal inoculation of migrated trees.

The dynamical, structural and integrated properties and processes of ecosystems and social systems as CAS provide silviculturists with a powerful conceptual model for effecting change. That CAS are sensitive to initial conditions and memory means, for example, that silviculturists can cultivate healthy, adaptive and resilient forest ecosystems through harvesting and reforestation practices that conserve key parts and processes, such as legacies, meta-networks and energy flow. That forest ecosystems are integrated with our social networks means we have the opportunity to lead a new social mindfulness in forest stewardship and conservation. Conceptualizing and understanding forests as CAS provides us with a practical framework for practicing mindful silviculture. By understanding the parts and processes, and how they interact to produce emergent properties such as regeneration, biodiversity or productivity, we can create and learn about new silviculture practices that encourage forest adaptation and resilience to support thriving societies in an uncertain future.

Suzanne W. Simard is a Professor of Ecology in the Department of Forest Sciences and Conservation in the Faculty of Forestry at the University of British Columbia, Vancouver. She studies structural-functional relationships in forests and how they inform forest management, and leads a graduate training program on communication of global change research.

profiles.forestry.ubc.ca/person/suzanne-simard

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Focus on Safety

By Gerard Messier, BC Forest Safety Council

I suspect you might be a lot like me when it comes to driving. You've spent most of your life driving vehicles, covering many thousands of kilometers of gravel road all over the province. You've had no serious driving incidents, and consider yourself a good driver.

Let me explain why this is the perfect time for you to take a driver training course.

Driving is a skill that most of us practice every day and when we do something that often, we develop habits both good and bad. Participating in driver training will give you the benefit of having a professional driving instructor in the seat beside you, showing you how to reinforce the good practices and correct the bad.

Consider some of the following good driving practices that I learned during my recent driver training:

Driving Position and Posture – I hadn't spent so much time correcting my posture since elementary school! Sitting properly in your vehicle improves alertness, speeds up reaction time, and creates a good connection between you and the vehicle. Picture a professional athlete in a relaxed but ready stance. It's the same idea when you are driving. Position yourself so you are stable, but also ready to react when you need to.

Preparation and Planning – Preparation for driving starts the day before you travel. Do you have good directions to your location? Is the pre-trip inspection done on your vehicle? Are you set up to get a good night's sleep? All of these things are needed for a successful trip.

Minimize distractions – It is difficult to eliminate all distractions while driving. We have radios, other people, and often a second office in our vehicles. Minimize these distractions by keeping the cab of your vehicle tidy, secure loose items, turn off the music and listen to the other road users calling their kilometers. Enlist your passengers to help with the task of driving. These co-pilots can help by watching for hazards such as wildlife or making the appropriate radio calls, helping the driver focus on the task of driving.

Photo courtesy of Gerard Messier

Steering Technique – When I was a teenager, I learned to steer using the hand over hand technique which puts my arms in front of the steering wheel. This was before airbags were common in vehicles. My instructor mentioned that air bags deploy at up to 320 km/hr and your arms will get pushed back into your face at that speed if you use that technique. Enough said. I learned a new steering technique called push-pull steering to avoid that problem.

Self-Checks and Taking Breaks – During long drives, getting tunnel vision or zoning out and not remembering the last few kilometers are good signals that a driver needs to take a break. Rather than trying to fight fatigue by opening the window or singing to yourself, stop in a safe spot, get out of the vehicle and walk around. This approach will refresh your body and mind and you'll be ready to drive again after a short break.

Vision – The next time you go for a drive, check to see how far you look ahead of your vehicle. Most drivers only look between 3 to 5 seconds ahead. Ideally, you want to be looking at least 12 seconds ahead of your vehicle and even further where possible. Looking this far ahead gives your eyes and brain more time to interpret what is happening in front of you and allows you to react accordingly.

Good driver training improves your skills and your driving attitude. The training makes you stop and consider all the abilities needed to be a safe driver and the tremendous responsibility that comes along with this. Reconnecting with this responsibility helps you cultivate the right driving attitude with qualities like patience, courtesy, and alertness.

Consider taking a refresher driver training course. The best way to hone these skills is with an experienced instructor by your side. Not only will you learn the right skills, you will also develop the right driving attitude -- a powerful combination to keep you safe.

Gerard Messier is the Manager of Training and Program Development at the BC Forest Safety Council. The Council is the industry's health and safety association and "one stop shop" for safety resources, tools and certification.

The Importance of a Land Ethic in the Management of Private and Tenured Forestlands in British Columbia

By Fred Marshall

In the last two issues, *Silviculture Magazine* has provided readers with two vividly contrasting perspectives on resource management of private forestland. In this article we provide a perspective on the stewardship of managed forests on private and tenured land from the perspective of a woodlot owner with a land ethic.

In the first article ("Public Attention for Private Forests", Spring 2013), Rod Beeling, executive director of the Private Forest Landowners' Association (PFLA) claimed resource management of managed private forestlands in British Columbia is exemplary asserting that the owners of these lands are 'good neighbors'.

In a rebuttal ("Whoa, Neighbour: How privately managed forest land owners broke the social contract", Summer 2013), Carrie Saxifrage, a landowner and resident of Cortes Island, countered Rod Beeling's perspective saying that management practices by private forest landowners are unacceptably poor and these private forest landowners are anything but good neighbours.

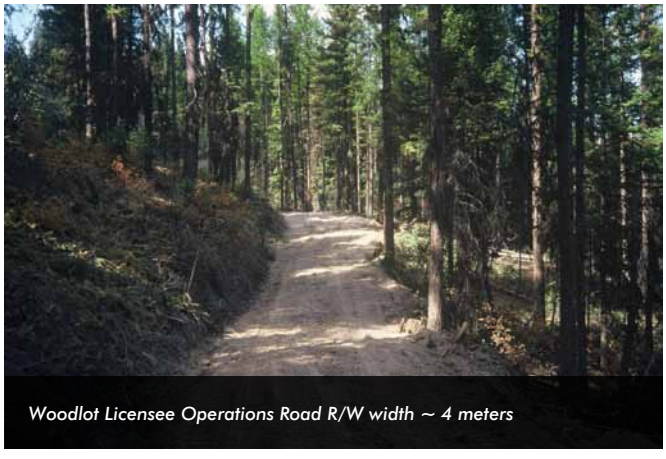
Here we put these two articles in context by making a distinction between the two largest members of the PFLA and its remaining 261 members, which are relatively small forest landowners. Of the provincial total area of 823,582 hectares of forestland under private management, TimberWest owns approximately 327,678 hectares and Island Timberlands about 258,000 hectares collectively comprising 71 per cent of the provincial total, all on the Coast. Saxifrage's experience is with these two large private landowners and with the forest practices of Western Forest Products on its tenured Tree Farm Licence lands.

In British Columbia, private rights can also be granted over Crown land through tenure agreements. Three common forms of tenure agreement are Tree Farm Licences (TFL), Community Forests, and Woodlots. For the most part, TFLs are controlled by an oligopoly of corporations; Community Forests by forest-dependent communities including First Nations; and Woodlots by private citizens. TFLs cover 5.6 million hectares with an Allowable Annual Cut (AAC) of 12.5 million cubic metres. As with private land, timber harvesting is area-based on Community Forests and Woodlots. On TFLs, AACs are determined on a volume basis in the same way as they are determined on Crown land for Timber Supply Areas (TSA).

Does legislation make any difference? Laws and regulations are different for privately managed forestlands than they are for the management of Crown forestlands. However, most of the

Example 1: *Different land ethics of a woodlot licensee (a RPF) operating on Woodlot License and of a foreign-owned forest company operating on a TFL with several RPFs on staff.*

Both operations were conducted in the same forest types, in the same drainage, with some contiguous boundaries; all operations were compliant with the Forest Practices Code and were fully legal. The woodlot license is financially solvent and is FSC certified ; the foreign-owned company went bankrupt; it was ISA certified.



Woodlot Licensee Operations Road R/W width ~ 4 meters

Tree Farm License Forest Company Operations Road R/W Width ~ 20 meters

legislation to which Bealing refers applies to both Crown and private forestlands. However, any regulatory requirements relating to the quality of forest management on Crown land are entirely voluntary on private forestland: for example visual quality.

Does it make any difference whether forest practices are on tenured Crown land or on private land? The answer is a resounding NO! The fact of the matter is that on near-privatized, tenured Crown forestland and on private forestland one can find examples of good and bad forest management most of which conform to forest laws and regulations that have been deregulated and rewritten since the turn of the century. Current forest law and achieving the desired results there-under is premised on professional reliance.

Professional reliance like forest certification is only as good as the person practicing it based on the forest and environmental laws of the province. So, why do we find these extremes in the quality of forest management? The answer is likely to be found in the presence or absence of a land ethic governing the actions of the landowner or tenure-holder. Of note, an explicit land ethic is also absent in the laws and by-laws governing forest professionals on whom the public now relies for good forest management.

So what is meant by a land ethic? Aldo Leopold perhaps best explains the term in his book, *A Sand County Almanac* (Oxford University Press, 1949) in which he writes,

"All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to co-operate (perhaps in order that there may be a place to compete for) in short, a land ethic changes the role of homo sapiens from conqueror of the land community to a plain member and citizen of it. It implies respect for his fellow members, and also respect for the community as such.

A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health for the land. Health is the capacity of the land for self renewal. Conservation is our effort to understand and preserve this capacity.

It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.

Woodlot Licensee operations showing residual stand following logging; Area fully stocked. Photo by Fred Marshall

TFL Operations showing residual stand following logging; The area was ripped and planted; however, the plantation failed; it was subsequently mounded and replanted; it remains NSR. Photo by Fred Marshall

Perhaps the most serious obstacle impeding the evolution of a land ethics is the fact that our educational and economic system is headed away from, rather than toward, an intense consciousness of land.

The 'key-log' which must be moved to release the evolutionary process for an ethic is simply this: quit thinking about decent land-use as solely an economic problem. Examine each question in terms of what is ethically and esthetically right, as well as what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

For example, a provincial assessor may determine that the highest and best use for a parcel of land is for housing, industrial or commercial use all of which provide a very high monetary value. If the owner's motive is to make as much money as possible, then the land is likely to be managed unsustainably with little or no regard for a land ethic; whereas if the motive is to manage the land for sustainable use of its natural resources and for the ecological services they provide, then a land ethic will prevail.

And how does professional reliance play into this example. The forest professional's ethical duty is to the public, the profession, the client or employer and to other forest professionals – in that order. The public interest is largely determined by legislation. Duty to the profession is about upholding its good name. Therefore, in the absence of a land ethic, adherence to the employer's or client's wishes will determine how well the forestland is managed.

While resource professionals may have high professional ideals -- they are subject to their client's wishes, within the appropriate bounds of "management prerogative", wherein the owner of the land or tenure has the ultimate say over how any parcel of land will be managed. The resource professional will make his own decision relative to the ethical appropriateness of carrying out the owner's wishes. Some may choose different employment.

Ultimately, in British Columbia, how well private or tenured forestland is managed, and how sustainably its resources are used, largely depend, not on legislation or land ownership but on the land ethic of the landowner or tenure holder. Until a land ethic is formally enshrined in the laws governing forest management and forest professionals, public and neighbours alike will be subject to the beliefs and values of landowners, tenure-holders and the provincial government – the public's forest land agent.

The photos included in this article provide three examples illustrating that what happens to the land is not related to whether the land is private, tenured or Crown owned, to whether management is area or volume based, or to differences in legislation. In all three examples, the outcome is directly related to the land ethic of the landowner or tenure-holder.

Example 2: *Area of private land removed from a TFL, subsequently sold to a forest company, clearcut and now for sale. The logged area is a wasteland filled with several invasive weeds; site disturbance was extreme; the riparian area was logged of all coniferous trees.*

Photo by Jane Marshall

Example 3: *Private lands being extremely grazed with severe degradation of the riparian area of a fish stream.*

Photo by Jane Marshall

Adjacent upland area showing severe overgrazing. Photo by Jane Marshall

Reader's Lens

Photo by Jonathan "Scooter" Clark

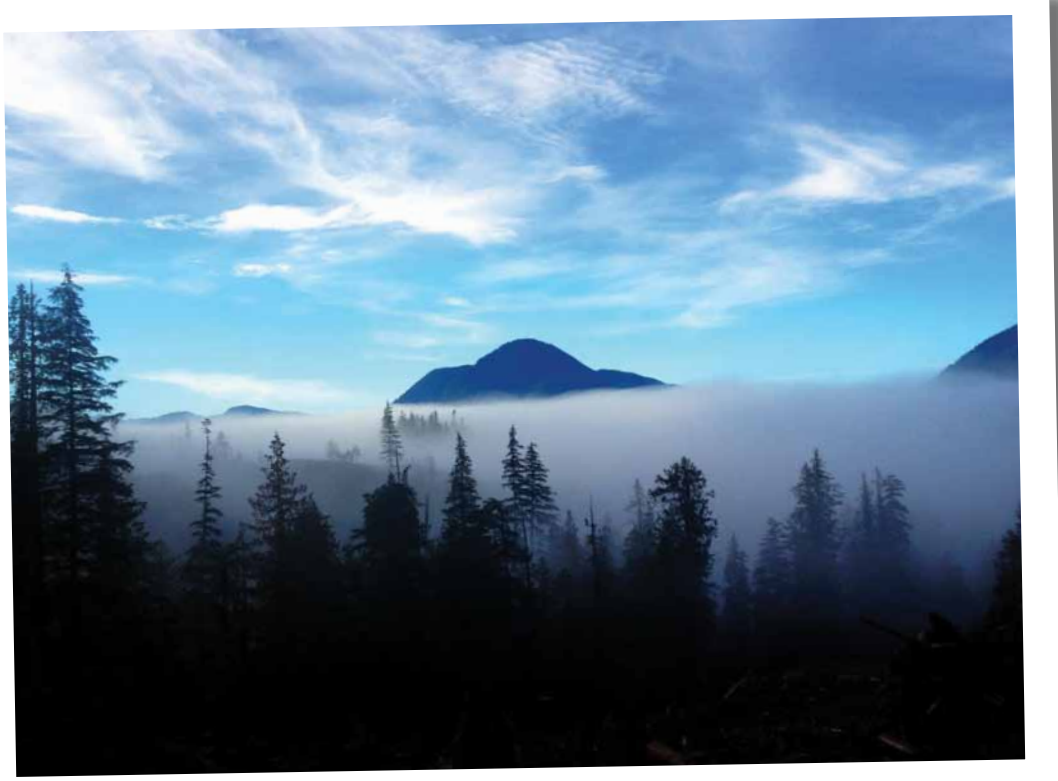


Photo by Kim Niddery

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Western Report

Western Silvicultural Contractors Association

By John Betts

Why profit is necessary for silviculture contractors and the economy

It may be stating the obvious, but silviculture owners should run companies that make a profit. Whether firms are actually doing that is not so obvious. At least that's what I have to conclude after hearing contractors describe their various business models at the last WSCA Pricing and Market Summit.

It is apparent that most contractors are making money. At least many are making money flow through their companies. And at the end of the day, or the field season, there is some left over for them when things go well.

Nevertheless true profit should not be confused perceived profit – money that owners might pay themselves or glean from cash flow. True profits are the earnings remaining after all expenses are paid. And it is here that the ambiguity begins for many of the proprietorships that make up the contractor community.

Not properly defining profit is one of the contributing factors to why our sector undervalues itself. Our sector has to stop measuring success as being able to charge less for its services. Success should be measured by the far more challenging task of figuring out ways to charge appropriately for services. Budgeting true profit is part of that.

To understand profit means understanding why one is in business. That means subscribing to some financial principles and practices that should inform why anyone would become an entrepreneur. To explain them are numerous abstruse concepts around idealized competitive economies, social surplus, informational assymetries and the ways economic actors behave. But let's keep it simple.

Owners, in theory, go into business because it presents an opportunity which involves a chance to make things better for themselves as opposed to staying where they are financially (i.e., not going into business, remaining an employee, and so on). Of course there may be other loftier motives too: like making the world a better place; or doing a better job. But the real impetus in a competitive economy is about getting more for your efforts. That involves making and maximizing profits.

In practice, owners should recognize they are two things: they are an investor and a manager. As a manager you should pay yourself the same you would pay someone else to do the job. You can't be your own charity. It won't work. Also consider how much skill it takes to be a competent manager. And consider how much those skills are sought by other well-paying sectors like mining, oil and gas, transportation and so on. So pay yourself accordingly. Don't undervalue the work you do. Otherwise you are squandering one of the opportunities being in business offers.

As an investor you need to consider your effort, the cash you offer and the risks you undertake. Your time and commitment as an owner is part of your investment and there needs to be a return on it. The hard investment, like the cash you raise, needs to be compared to what it would make elsewhere. The four percent many firms report as their estimate of profit is the same or below what a tame conservative stock portfolio offers today. That gain is at minimal risk. Also note that some silviculture firms would have been better off trading their customer's shares then contracting for them this year.

As for risk, under Canadian contract law the moment you submit a bid you attract a liability. And those just pile up as you enter an actual agreement, generate a payroll, use your line of credit, deal with CRA, satisfy the various regulators and so on. And that exposure to the undercurrent of legalities you attract says nothing about trying to manage your variable costs, the uncertainties of seasonal work, keeping your workers and clients happy, and delivering a product of near perfection on time to avoid penalties.

The last paragraph of risk just speaks to the things you can manage. Profits are also affected by the things you can't manage. In that case, profits are a necessary hedge against one bad contract putting you out of business for reasons you can't control.

In the long term profit is necessary to generate some future security. How sellable is a company that doesn't show a profit? This assumes you actually have something you could sell. If not, then how will you pay your way when you no longer can chafe at the traces pulling your business through another season? Making and putting away profit is necessary for that inevitable day.

There is even a moral component to making profit. The ideal competitive economy consists of profit-maximizing firms and utility-maximizing consumers. The idea is that these transactions create surpluses, which are used by generous investors to fuel the economy. If there were no surpluses then the economy stagnates as investment falls off. So in the big picture owners need to do their part so that the larger economy keeps chugging along. Otherwise they are just wearing out their work clothes as things cycle downwards.

Ontario Report

Ontario Forestry Association

By Jessica Kaknevicius

What would your life be like Without Wood?

Your house. Your furniture. Your office supplies. Your musical instrument. You use wood on a daily basis.

Trees and forests give us more than just paper and because it is a renewable resource, they will continue to support us for years to come. The fact is, regardless of where you live in Ontario or Canada, you are intricately attached to forests and forest management. We are all users of wood so let's talk openly and honestly about how we use wood and cut trees.

Yes, we cut trees.

You may have a wood table in your house, maybe hardwood floors, or even have a special fondness for that wood bowl you received as a gift. You like wood because it tells a story with its grain, where no two pieces are alike, and it gives a sense of warmth. But did you know that wood and constituents of wood are found in everyday products beyond the traditional? Car parts, computer screens, food preservatives, cosmetics, and even clothing contain wood products. Wood is natural, biodegradable and renewable. That means that it has the potential to support us for years to come when well managed.

Today there is a great disconnect between us and the use of wood, especially in urban areas. We have an image that forestry means deforestation and in some parts of the world, this holds true. The unsustainable use of the forest is pressured by international wood demand combined with lack of local forest policies and regulations. Many seem to have taken that to mean that forestry everywhere follows this same prescription.

Ontario and Canada are world renowned for our sustainable forestry practices. We have strong legislation and forestry professionals working in our forests who follow a code of ethics. This means that we can be proud of the wood that comes from our province and our country. If you buy local wood, that means you are providing local jobs and supporting your local economy. We should be proud of our forest products and we should share this sense of pride with the public.

The Ontario Forestry Association is uniquely positioned to provide balanced and fair information about forestry in our province. We are not an industry organization nor do we speak for industry, but we understand forests and how we manage them. This is why we are launching a public conversation that we are calling Without Wood. Our launch event is set to take place during National Forest Week in Toronto and will draw a new audience to learn about forestry in Ontario.

"Today there is a great disconnect between us and the use of wood, especially in urban areas."

Why do we want to change public opinion? There is great misconception about how we do forestry in Canada. The issues are often misrepresented by activist organizations leading the urban public to become misinformed about the ways in which we manage forests. We want to take people on a journey to discover forests, how they grow and change and how they benefit us as human communities. We want to talk to people as consumers of wood products, because no matter how you feel about cutting down trees, wood products are part of our daily lives. We welcome suggestions, comments, opinions and perhaps even a thought or two about what your life would be with or Without Wood.

Follow the Ontario Forestry Association by becoming a member or following us on one of our social media networks. Join us in the conversation about what forests and forestry mean to the people of Canada, and why they need to shift their opinions about forestry. For more information about the OFA and the Without Wood program, visit www.oforest.ca/withoutwood.

Alberta Report

Forest Resource Improvement Association of Alberta

By Todd Nash

The Forest Resource Improvement Association of Alberta (FRIAA) is a not-for-profit association governed by a Board of Directors who report to its industry members and to the Minister of Environment and Sustainable Resource Development (ESRD). FRIAA has a mandate to deliver programs and initiatives that enhance forest resources and that benefit Albertans. FRIAA has a strong track record of efficient program delivery with full public accountability. There are currently six separate programs under the FRIAA umbrella, each with its own specific objectives related to forest reosurce improvement. A total of $347 million has been spent, and well over 1,500 individual projects have been completed using FRIAA funding since the association's inception in 1997.

Forest Resource Improvement Program

FRIAA's cornerstone program is the Forest Resource Improvement Program (FRIP). FRIP involves collecting dues from industry to fund projects that enhance forest resources or the management of forest resources for the benefit of all Albertans. FRIP projects have become a very effective and common way for the forestry, lands, and wildlife communities to work together towards enhancing forest management systems.

FRIP projects can include a wide variety of activities. The common thread for all of them is that they directly improve forest resources or enhance the management of forest resources in Alberta and that they go beyond legislated requirements of industry. Most FRIP projects are delivered by FRIAA members, using partners and subcontractors throughout the forestry sector.

Since the inception of FRIAA in 1997, over $200 million has been contributed towards FRIP projects that support key aspects of sustainability and resource enhancement through:

- **On-the-ground work to improve forest stands and wildlife habitat**
- **Integrated resource and land-use planning and inventory work**
- **Applied research projects**
- **Public education and awareness**

Community Reforestation Program

Transferred to FRIAA in 2000, the Community Reforestation Program (CRP) involves collecting reforestation levies from small timber operators to fund reforestation activities in relation to the Community Timber Program. FRIAA targets the established regeneration standards published by the province in carrying out reforestation. Service providers are contracted by FRIAA to deliver the activities required to conduct reforestation. These may include FMA holders, groups of Commercial Timber Permit CTP holders, and silvicultural contractors.

Since the implementation of the CRP in 2000, total program spending has been over $55 million:

- **Over 38 million seedlings have been planted.**
- **Over 50,000 ha of land have been reforested.**
- **Nearly 30,000 ha have met the intended standard on final survey.**
- **Work is ongoing on the remaining area.**

Wildfire Reclamation Program

The purpose of the Wildfire Reclamation Program (WRP) is to assist in reclaiming and re-establishing forest cover on areas that have been harvested by industry and replanted, but subsequently damaged or destroyed by wildfires. Any cutblock that has been harvested, treated in any way for reforestation, and burnt over is eligible for assistance from the WRP. The WRP is an important part of the Ministry's extensive efforts to sustain forest growth in relation to wildfire management.

In 1998, wildfires destroyed over 30,000 ha of regenerating cutblocks. A $35-million grant was provided to assist in re-establishing forest cover, with the following results:

- **Over 40 million seedlings were planted.**
- **100% of the area has been returned to productive forest.**
- **Total expenditures exceeded $37.6 million (additional expenditures were covered by investment income).**

Since 2007, $39.3 million in grant money has been provided to FRIAA to treat over 21,000 ha of cutblocks damaged by wildfire.

Mountain Pine Beetle Mitigation Program

The Mountain Pine Beetle Program (MPBP) provides funding for industry to participate in activities relating to the control and mitigation of mountain pine beetle (MPB) infestation. The program is key to providing opportunities for the industry to participate in MPB control and to maintain a coordinated government and industry response. Incidental Conifer Replacement Program

Since its inception in 2007, the MPBP has been granted $22.7 million and provided over $21.5 million in funding for activities such as:

- **Detecting beetles through ground and aerial surveys**
- **Removing infested trees**
- **Preventing spread of beetle from log yards**
- **Pheromone baiting**
- **Protecting seed orchards and genetic trials**

Incidental Conifer Replacement Program

Aspen stands that were harvested in certain management units had scattered coniferous trees. The Incidental Conifer Replacement Program (ICP) collected specific reforestation levies from these stands and reinvests the money in projects that enhance the growth of coniferous trees on Alberta's public land.

The ICP was established in March 2005, when the Minister transferred $2.8 million to FRIAA along with the mandate to complete the program activities initiated by the Crown. Activities have included:

- **Enhancing understory inventory for better protection/ avoidance of conifer patches during harvest operations**
- **Planting over 1.3 million seedlings in burned areas or regenerated deciduous stands**

Mountain Pine Beetle Forest Rehabilitation Program

FRIAA's newest program, the Mountain Pine Beetle Forest Rehabilitation Program (MPBFRP) provides funding to industry (FRIAA members) to carry out activities that help to maintain or enhance forest resources by rehabilitating forest lands that have been negatively impacted by Mountain Pine Beetle. The program contemplates activities such as planting, seeding, stand tending, information gathering and other rehabilitation activities.

Forests and their Soils are Twice as Important as Carbon Sinks

By Dale Prest

Silvicultural interventions that avoid large openings in the canopy and that do not expose too much of the mineral soil will be best to maintain and rebuild depleted soil carbon levels. Photo by Dale Prest

Soil science may soon double the size of forest carbon sinks that foresters can manage.

Conventional science has it that intensive forest management practices like clearcutting have a negligible impact on mineral soil carbon storage. As a result, forest carbon modelers, researchers and policy makers assume that it is only the carbon stored above the ground and in roots that we can change with management. Forest carbon offset standards omit monitoring of non-root soil C pools through the lifetime of verified offset projects, assuming that no significant changes will result from management.

The assumption that soil carbon stocks are stable has led to the conclusion that the only way to utilize forests as carbon sinks is through increasing carbon in aboveground biomass and increasing carbon stored in durable forest products. Likewise, substitution effects of subbing out carbon intensive fuels and materials for wood-based fuels and construction materials have been proposed as a viable way to leverage forests to slow the increase of atmospheric carbon dioxide.

Reducing forest carbon management to two basic pools – biomass and forest products - has led to a debate about how to best manage forests to achieve long term removals of carbon from the atmosphere.

Conservationists have proposed straight-up protection of forests from any cutting to maximise carbon stored in biomass as the best way to fight climate change.

Industrialists have proposed that maximum utilisation of biomass in the form of forest products that replace or substitute more carbon intensive materials and fuels are the best way to keep carbon out of the atmosphere.

This false dichotomy – 100% protection vs. 100% utilisation – has polarised the debate over how best to manage forests to fight climate change, and has not served us well.

A recently published paper by a team of researchers from Dartmouth College, the University of Vermont, Lund University in Sweden and the Vermont Department of Forests, Parks and Recreation could lead to a viable middle-path.

Published in Global Change Biology Bioenergy and titled 'Mineral soil carbon fluxes in forests and implications for carbon balance assessments', this paper calls into question the commonly accepted science that clearcutting does not significantly impact soil carbon. They do this by bringing together evidence from recent field studies which indicate that clearcutting mobilises – for whatever reason – a significant portion of the carbon in soils.

If clearcutting causes a medium term loss of carbon – and studies suggest that it can take up to 80 years to recover the carbon lost – then intensive management practices that utilise clearcutting could be releasing more carbon into the atmosphere than is being stored in forest products.

And because there is so much carbon stored in soils – estimated to be up to 2 times as much in the top meter of soil as exists in all other aboveground carbon pools – even a relatively small loss of carbon from soils can offset and reverse any gains in carbon storage from forest products and substitution effects.

The authors propose ways for scientists, foresters and policy makers to further investigate these soil C dynamics and begin to incorporate them into our models, management and policy. Those wishing to claim societal carbon sequestration and storage benefits through intensive forest management, for example, must shoulder the burden of proof to show that their management practices are not causing a net carbon loss from forest soils.

This presents a huge opportunity to those charged with managing forests, particularly in temperate regions where fires are not a significant natural disturbance.

In the Acadian Forest region, it's not uncommon to find forest sites that have been heavily cut three or four times in the last two

centuries, and now rotations are getting shorter. If this pattern of harvesting has reduced the amount of carbon stored in the soils of those sites, this represents a huge potential carbon sink that could be leveraged to pull greenhouse gasses out of the atmosphere and buy society time while technologies are brought online that eliminate altogether the need to emit carbon.

How? Well, inputs of carbon into soil must be greater than outputs of carbon from the soil.

Increasing inputs is easy. Beyond growing more trees that input sugars and roots into the soil, we can increase soil carbon by increasing inputs from dead wood as well. When a log decomposes, only a portion of the carbon in it is given off as carbon dioxide. Some of that carbon gets drawn down into the soil by microbes like fungi, whose tissues are composed of almost fifty percent dry weight of carbon.

This means that forest managers will need to stop looking at dead wood as waste, and that harvest residues, dead trees and low quality stems may be more valuable as stored carbon than as a traditional lower end wood fibre product. Organic carbon stored in soils has the added benefit of improving soil ecosystem health and biodiversity, enhancing site productivity as expressed in wood increment.

Limiting outputs is straightforward, but does require modification of predominant harvesting practices.

First and foremost managers should aim to avoid large scale disturbance of the mineral soil. Timing of operations and using proper equipment to limit scarification is important for maintaining carbon in soils.

Perhaps most importantly, we should aim to maintain a cool and moist environment

Rebuilding depleted soil carbon stocks will require allowing low value wood to remain following harvests. In addition, maintaining abundant dead wood and soil organic matter levels will contribute to the health of the forest soil, increasing productivity and tree growth. Photo by Dale Prest

at the forest floor. Studies of other soil nutrient dynamics suggest that if you keep canopy openings below 10m in diameter, soil nutrient cycling doesn't much change. Likewise, maintaining at least 70% canopy closure in thinnings or multi-stage shelterwoods ought to do the same, and make sure established regeneration covers the forest floor before you do that final removal.

In other words, by avoiding exposing the ground to too much sunlight at any one time we can at least maintain the amount of carbon in our soils.

Of course, this soil carbon-building strategy is not appropriate for all forest types. Increasing dead wood is better known as a fire risk in many forests. Likewise, maintaining a cool and moist forest floor environment is simply not possible in dry forests. Managers will be required to customize practices within particular regions to achieve soil carbon stock increases.

What's important is that by incorporating soil carbon into forest carbon management, we can manage forests in such a way that produces timber, creates jobs, maintains canopy cover, values dead wood, and provides wildlife habitat all at the same time. Forest biodiversity and health are improved, a very important consideration as forests are subjected to ever-greater stresses of a changing climate. Conservationists and industrialists ought to recognise that this approach offers the best of both worlds, and represents a position that reasonable people on both sides of the debate can get behind.

Dale Prest is the Ecosystem Service Specialist at Community Forests International- an environmental start-up that is working to change how societies interact with their supporting ecosystems. Their projects include developing resilient, grid-less electricity systems in Pemba, Tanzania and incorporating the value of carbon storage into forestry practices in Canada. dale@forestsinternational.org

The Challenges of Active Forest Management in an Ecological Reserve

By Andrea Watts

When your Habitat Conservation Plan (HCP) requires the accelerated development of a second-growth forest into a late-successional forest, that's a tall order, especially when there isn't an established silvicultural prescription to create such a forest structure. But when your prescriptions call for thinning in a landscape that is designated as an ecological reserve and your stakeholders—who include the state's Sierra Club chapter, a City Council, tribes, and the public—support your management strategy, you must be doing something right. In Seattle Public Utilities' (SPU) Cedar River Municipal Watershed, silviculturist and SAF member Rolf Gersonde, along with members of the agency's Forest Ecology Work Group, are at the center of a demonstration project showcasing how active forest management and stakeholder involvement are helping to meet the watershed's ecological objectives of delivering quality drinking water and ecosystem services.

Two-thirds of the drinking water used by 1.4 million people in the Seattle metro area comes from the Cedar River Watershed, which spans 90,638 acres in the foothills of the Cascades in Washington State. More than 80 percent of the watershed was logged during 20th century, with the last harvest done in 1995; since 1900, annual harvests averaged nearly 60 million board feet. Now, less than 17 percent of the area remains unharvested, with the rest being second-growth forest of various ages. Douglas-fir and western hemlock forests of 50 to 90 years old cover much of the watershed's lower elevations, while western hemlock and pacific silver fir of 20 to 50 years old are found in the upper elevations.

Through a series of land transfers over the years, the city became the sole owner of its watershed lands in 1996. With the anticipated listing of Chinook salmon as an endangered species, SPU began work on the Cedar River Watershed Habitat Conservation Plan (HCP) in 1993, as the diversion of water from the Cedar River was recognized as impacting the salmon.

When in 1996 Seattle's citizens were presented with the draft HCP that proposed funding the HCP through revenues from commercial thinning timber, Gersonde said that they argued instead for setting aside the nearly 85,500 acres of second-growth Douglas fir and late-successional forest as an ecological reserve, effectively prohibiting commercial timber harvesting for the purpose of generating revenue. To fund the HCP, the public agreed to pay higher water rates instead. Thinning, however, was still needed.

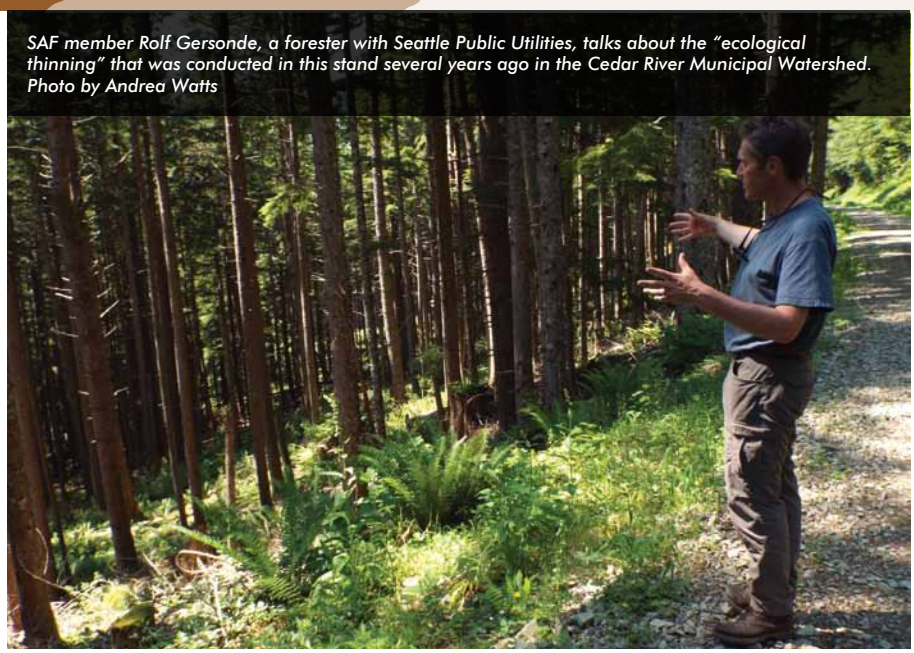
When he joined SPU in July 2004, Gersonde was immediately thrust into the intense stakeholder process of implementing the HCP's ecological thinning program. In addition to the primary forest management goals of protecting and restoring biological diversity and protecting water quality, the HCP called for "accelerating the development of late-successional forest attributes in second-growth forest, improving habitat for species of concern that depend on late-successional forest." Accelerating this development would be accomplished through restoration thinning of the younger stands to adjust spacing, reduce competition, and increase species diversity; the ecological thinning in the older stands would create more structural diversity within the canopy and accelerate the growth of understory vegetation.

Although the public isn't receptive to logging, the thinning of young stands isn't controversial. "But when we get into thinning older forests to introduce a second cohort and create greater canopy heterogeneity," Gersonde said, "people have questions about that, about whether or not this is necessary, given that our expectations for forest stand development patterns are such that eventually, no matter what we do, we anticipate that there eventually develops an old forest structure anyway."

To gain support for the ecological thinning of the older stands, Gersonde explained that they conducted one thinning operation without the stakeholders' involvement to demonstrate what the pre- and post-thinning would look like. For the succeeding projects, they involved the stakeholders by holding workshops, conducting field trips at the thinning sites, and discussing the benefits of thinning. One of these ecological thinning sites was the 700 Road project that spanned 2006 through 2008. In this area, stands of mostly western hemlock with some Douglas-fir with a pre-thinning 190 to 350 trees per acre were thinned to 140 to 280 TPA (from 330 square feet per acre to 250 square feet per acre).

"Overall, the stakeholders were appreciative of what we showed them," Gersonde said, though some of the stakeholders had philosophical differences regarding the need for thinning. The ecological thinning also received support from an unlikely ally.

"The Sierra Club has the policy to not support any timber harvest on federal and public lands, but the local chapter has taken a stance apart from that policy and is supporting our program as being experimental and limited in scope, and not revenue-generating," said Gersonde.



SAF member Rolf Gersonde, a forester with Seattle Public Utilities, talks about the "ecological thinning" that was conducted in this stand several years ago in the Cedar River Municipal Watershed. Photo by Andrea Watts

The Cedar River Municipal Watershed Upland Forest Habitat Restoration Strategic Plan outlines the forest management activities that will occur throughout the watershed. Although "this ties our hands in some ways to doing only a certain amount of activities every year," Gersonde explains, "we have since asked the city council for a case-by-case ordinance for a specific project, but also asked for an ordinance to sell over 6 MBF over five years and to allocate that to certain areas that we specified, and that was approved as well. [This gives us] a little bit of flexibility for what we do, when we do it, and in what years."

Reinvesting Profits

While the thinning operations don't have revenue objectives, any profits that are realized are placed into SPU's water fund to offset the cost of funding the HCP. Gersonde said that the cost of the HCP is actually going down. With 13 years having passed since the HCP's beginning, some of the restoration-thinning programs are winding down in the younger stands, and the Forest Ecology Work Group is transitioning from strategic planning into implementing elements of the HCP, such as road decommissioning. Gersonde estimated that ten miles are being decommissioned each year. The roads being eliminated are those that models show as creating sedimentation problems or that are located in areas where logging won't occur.

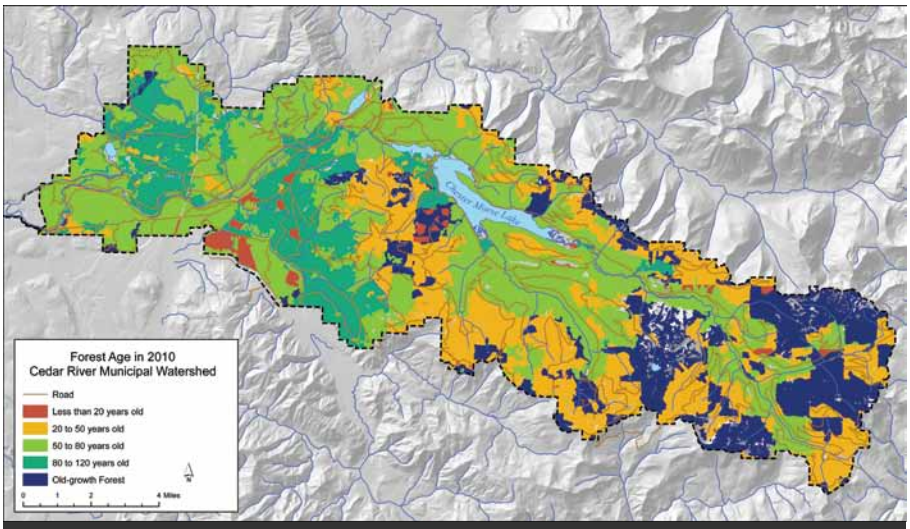
Because the HCP requires the creation of a late-successional forest from second growth, something that hasn't been attempted before on such a large scale, Gersonde said they actively collaborate with the Washington State Department of Natural Resources, the US Forest Service, and the University of Washington on experimental silviculture prescriptions, such as variable density thinning, with the intention that these prescriptions could be implemented in other stands if proven successful. Collaboration also occurs with the Muckleshoot Indian Tribe by conducting projects that enhance cultural resources, such as huckleberries and wildlife habitat.

To measure the success of these thinning and habitat projects, roughly 100 permanent sample plots across the watershed have been established for collecting data on whether the silviculture prescriptions are working. Gersonde sees this data collection as making a difference in demonstrating to the public the success of their management efforts.

"We monitor our outcome. We don't set up projects and walk away from them," he said.

And while he knows this monitoring is worthwhile, it does take effort to include the monitoring expense within the watershed's budget.

In spite of the watershed being closed to public access, there are opportunities for the public view the HCP in action, whether by visiting the Cedar River Watershed Education Center, joining public tours, or through school programs or field trips. There has been talk of allowing greater public access to the watershed, but that will be somewhere in the future, Gersonde said, as the maintenance of water quality, the security of the dam at Chester Morse Lake (the main water storage reservoir in the watershed), and the protection of the research installations would have to be addressed.



Timber harvesting has occurred on about 83 percent of the 90,000-acre Cedar River Municipal Watershed since 1900. Areas shown in blue are old-growth stands. Courtesy of Seattle Public Utilities

During his years of conducting outreach with the public, Gersonde has found that people have two misconceptions regarding forests.

"Sometimes people look at our programs [and] are actually astounded that there is a period of forest development that is not very diverse. The idea that if you just let the forest grow, it will grow to this [characteristic old growth] structure is just as misleading as well," Gersonde said, adding that he appreciates "getting new ideas from people who think very different directions and not necessarily adhere to certain ideas or effects. To pick up new ideas and not stick with the old patterns, necessarily, or the paradigms we've always thought of. Because there are new ideas that we need [to] at least try out."

Gersonde sees the future of management of the watershed as focusing on ensuring resiliency.

"Much of what we do is monitoring for forest health," he said. "What we've come recently to look at is the question of whether or not the forest is resilient enough to retain its assumed trajectory of developing late-successional forest habitat."

With resiliency in mind, Gersonde and his colleagues have initiated a trial planting of Douglas-fir whose seed source is from Oregon, far to the south, and planting Garry oak in the lower elevations of the watershed, a species likely present before fire was excluded from the landscape.

Doing more education about the breadth ecosystem services provided by the watershed, beyond just providing clean drinking water, is another aspect that Gersonde would like to focus on in the future. From this watershed, he said, society "derive[s] habitat values, carbon sequestration, cultural values. Those are nonexclusive benefits to society and I think we still have a long ways to go to explain to people that public management of these lands provides so much more to society beyond the immediate goods besides timber, water, wildlife."

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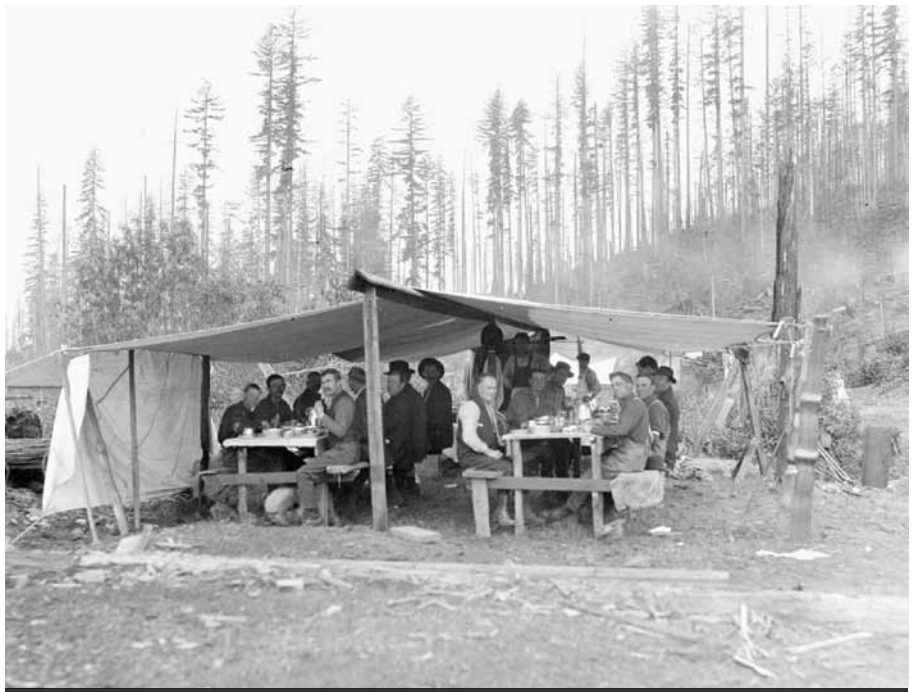

A logging camp dining tent in Cedar River Watershed, 1911. Between 1900 and 1923, an estimated average of nearly 117 million board feet was harvested annually. Courtesy of Seattle Municipal Archives