



# Silviculture

MAGAZINE

Spring 2012

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# Reader's Lens

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# Editorial

by Dirk Brinkman

## The largest natural capital investment in the world

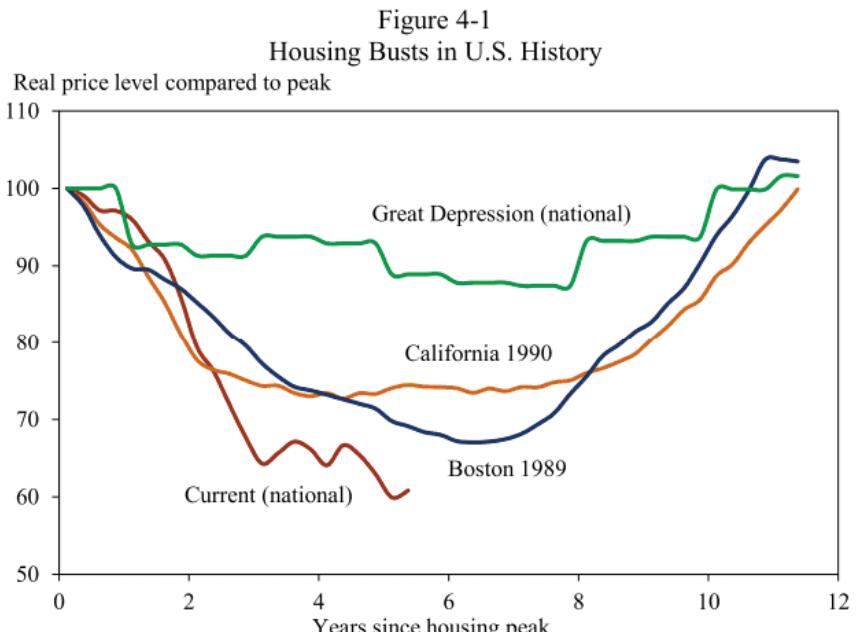
The world is a dangerous place, not because of those who do evil, but because of those who look on and do nothing.

~ Albert Einstein

Annually, Canadian provinces authorize the harvest of about a million hectares and then require the reforestation of this area. During this current wood market down-cycle, the area harvested and the area reforested has declined by 35-40%. But over the past decade climate change has resulted in more area being disturbed by the ravages of insects, fire and disease than in any time since glaciation. In western Canada alone (British Columbia, Alberta and the Yukon) Mountain Pine Beetles have left some 20 million hectares of dead standing forests. In the US, several pine related insect species have followed similar climate change vectors and devastated an even larger area.

Harvesting has a directly identifiable causal agent, and the government jurisdiction who grants the forest license holds the harvester responsible to replace, on exactly the area from which they benefited, the public capital they removed. Climate change, on the other hand, has an indirect human cause, making it difficult to identify polluters and hold them accountable, especially given the complexities of forest ecosystems and the behaviour of forest insects, disease or fire and the causal role of shifting climate patterns. It is also difficult to predict where climate devastation will concentrate; the location randomness of climate change makes the silviculture stimulus required to restore affected areas a sovereign or national obligation. This is especially true when the scale of restoring the devastation exceeds the capacity of one state or province to deal with it.

Ultimately, the responsibility to regenerate national forest areas requires a partnership between the province/state and federal governments. The opportunity for biomass, carbon credits and other direct public good benefits, such public private partnerships (PPP), invites the revival of concepts like the thirties' Civilian Conservation Corps, which protected and revitalized ecosystem services and wilderness parks.



Red = The \$2.5 trillion US subprime mortgage bust started in 2007, directly drove average US national housing prices down and triggered the unwinding of the global financial system, which pushed housing prices lower than any US bust in the last century

Blue = New England bust: which started in 1989

Orange = California bust: which started in 1990

Green = The Great Depression: which started in 1930. (see the article on 'A Global Civilian Conservation Corp' on page 10)

A similar youth cohort today would recreate natural wealth and safeguard human well-being.

## Wood prices bust with US real-estate assets

The US is Canada's primary lumber market and its housing price bust resulted in the worst down cycle in Canada's forest industry history; from 2004 to 2009 exports to the US declined 65%<sup>1</sup>. This US market decline has had an impact on all wood producers worldwide. "Stabilizing and Healing the Housing Market" is the title of Chapter 4 in President Obama's *2012 Economic Report of the US President* published by the Whitehouse for the Congress and the fascinating chart above is taken from that Chapter.

The President's report focuses on recalibrating federal mortgage and rental programs to stabilize the housing market, but the 12 year cycle concept of the chart sends a signal we may be at the bottom of this current housing crisis and wood demand down-cycle. While twice burnt thrice shy industry cynics may take little comfort in correlating 12 year cycles, bigger factors than US real-estate asset prices drive long-term wood price trends.

## A century of resource price increases?

In 1972, *The Limits to Growth* used a global supply/demand model to predict that the growing population's demand would exceed the earth's limited supplies, resulting in sustained real price increases for all resources. During the previous three quarters of a century raw resource



prices decreased steadily due to new resource discoveries, an industrial era of continuous efficiency improvement, material substitution from new technologies and buyer/distributor consolidation.

By 1980, Julian Simon, an economist who asserted that inventive, adaptive humans in a free market would never run out of anything essential, challenged worried environmental scientists to bet against the trend of decreasing commodity prices. Paul Erlich, author of *The Population Bomb* (1968), and John Holdren, now Obama's climate science advisor, took Simon up on his bet. By 1990, the five commodities they picked had all fallen in real prices by an average of 50%, while the global population grew by 900 million. Real resource prices continued to decline to the end of the century.

What is interesting about this story is that if Erlich had waited until today, Simons would have lost the bet, as four of the five commodities' prices have increased since 1980. The most striking change in the resource economy during the first decade of the 21 century is that the long pattern of annual price decreases is dramatically over. Virtually all resource prices have increased by several hundred percent, except wood.

What drove the past decade of resource price increases was not the human population reaching seven billion, but the number of global consumers doubling from one to two billion. It is not meeting the Millennium Development Goals to ameliorate extreme poverty by 2015 that has driven price increases, but the emergence of the new economies of South Korea, Brazil, South Africa, India, Vietnam, China & Taiwan. From now, until 2050, when the world population peaks at 9 to 10 billion, demand will continue to exceed supply if the rate of new consumers per decade remains in the order of 1 billion. But global consumer demand is not the only force driving wood prices.

#### Climate's forest salvage over-supply

Lodgepole Pine *pinus contorta* (PI) is a remarkable pioneer species. The first conifer to regenerate after a fire or other disturbance, PI grows so vigorously it was the lowest cost to free growing option for BC forest licensees. Some unusual growth secrets were recently confirmed by Dr. Chris Chanway at UBC after ten years of study. Lab trials tracked strains of nitrogen fixing bacteria that co-evolved within PI chlorophyll cells, accounting for up to 70% of the young pine trees' growth in nutrient

deficient soil. Pine is a remarkable species and the world has learned it can depend on it for many things.

In the 1800's, pioneers adopted First Nations' fire biome deer management practices to burn forests for rangeland and prospecting. At the turn of the century, BC's standing inventory of pine was about 300 million m<sup>3</sup>. Managing for timber value during the following century led to fire suppression in these fire biomes, so that by 2000 the standing inventory of pine had grown to over 1 billion m<sup>3</sup>. By 2012, twenty warm winters enabled super-populations of Mountain Pine Beetle (MPB) to feast on the pine laden tablelands and foothills leaving a standing dead pine inventory<sup>2</sup> of 850 million (m<sup>3</sup>).

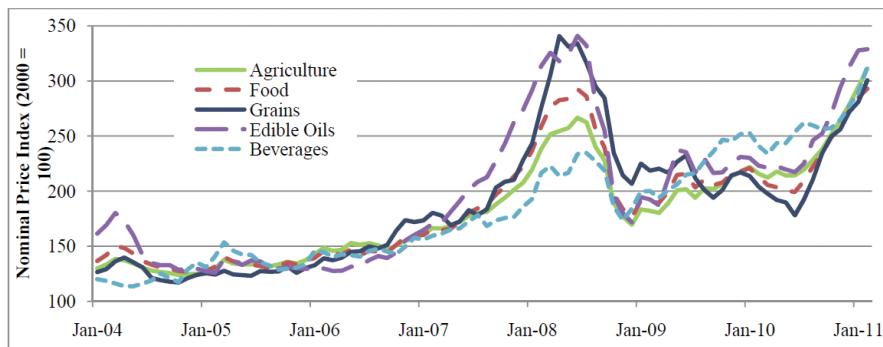
Canadian pine was not the only victim of insect populations riding the vectors of climate pattern change. Andrew Nikiforuk's *Empire of the Beetle* documents MPB march across North America from California to Alaska and MPB's various beetle relatives' assault on all other pine species across the continent; North America's total standing dead pine inventory may be in the order of two billion m<sup>3</sup>.

Dead standing pine inventory has a short 'shelf life'. American timber companies protect profits by threatening Canadian forest companies against 'dumping' salvaged pine into US lumber markets. Both countries face the problem of more dead standing pine than wood demand. Both countries look to bioenergy to get this fire hazard forest fuel off their fire-prone landscapes. BCs' five years of salvage license offers have not lead to whole tree harvesting for bioenergy in the 17.5 million hectares of MPB's dead standing pine. Bioenergy companies claim they cannot afford the reforestation costs that come with harvesting (costs that increase with climate change).

#### Climate adjusted reforestation

PI's susceptibility to the MPB and pathogens like *Dothistroma*, removed PI from the preferred planting species in pine's traditional Biogeoclimatic Ecosystem Classification (BEC) zones, especially for getting regeneration beyond free-growing to maturity. Climate change patterns that induce warming have given other insects

**Figure 1: Food commodity price spikes since 2004**



Source: World Bank.



# Editorial Cont'd

advantages; pathogens benefit from increased moisture while trees are being stressed directly by increased drought or snow-free cold snaps. Today's climate change and long-term projections into each species full rotation life-cycle required BC to develop climatically adjusted seed and species for the changing BEC zones—an unprecedented and almost unthinkably complex modelling problem.

During the wood market down-cycle, reduced stumpage revenues resulted in cuts to BC's Forest Service. Consequently, climate disturbances outpaced the capacity of the government to track impacts, much less survey and implement regeneration prescriptions. Once blind to what was happening and what had to be done, government communications became self-contradictory and seemed designed to obfuscate public discussions about the scale of the problem or the consequences of inaction. To date, no government publication dared consider the scale of funding required for the regeneration of existing and predicted forest disturbances. While a vigorous debate is presently underway about the unacceptability of inaction (Cit. Anthony Britneff, Ben Parfitt, ABCPF, BC Auditor General, BC Forest Practices Board, Globe & Mail, et al.) in this era of economic uncertainty, no one has suggested how to pay for reforestation's greatest challenge.

## Who will pay in an economic crisis

Each economic crisis seems to drain silviculture funding. In 2002, to rein in BC's provincial deficit, the government rescinded legislation requiring the district manager to plan and reforest current fire and pest disturbances. It replaced that obligation with a 10-20,000 hectare planting program branded 'Forests for Tomorrow'. Held up against the millions of hectares of MPB deforestation the Forests for Tomorrow program is as minuscule as a MP beetle- often described as the size of a grain of rice. BC's Request for Proposals for Restoring Forest Carbon (see slide 19) to develop up to a 10,000 ha public/private partnership to match bioenergy harvesting with restoration of forests, may help. But BC's slow growing forest credits will not provide the billions that appear to be required.

Alberta's \$600 million Bioenergy Producer Credit Program is more in line with the scale

of the initiatives required, but it has still to lead to MPB clearing in the provinces five year old infestation and fund restoration. Unlike what Alberta requires from forest harvesters, its oil sector is not required to reforest the geographically defined seismic lines, well sites and oil development sites beyond some grass seeding, even though it is clear who is responsible for the deforestation and who should pay to restore; growing the reforestation program beyond forest harvesting in Canada's oil and gas province's remains a challenge.

US bioenergy transport subsidy of \$40/tonne stimulated some forest fuel cleaning in fire prone biomes, but uptake barely scratched the forest climate crisis. Where are the 100,000 acre PPPs between agile restoration, climate credit, bioenergy corporations and adaptive state and federal governments?

The scale of forest disturbances from pests, fire and disease across North America is biologically unprecedented in post glaciation forest history . This makes modelling appropriate restoration prescriptions extremely difficult, but persuading investment in natural capital of this scale has a political precedent in Roosevelt's Civilian Conservation Corps. It does not take imagination to understand the value of employing youth, whose unemployment rate is over 20% and whose skill mismatch demand. In other highly deforested countries like Greece and Spain, youth unemployment is 35% and 45% respectively; a contributing factor fuelling the dissent of those involved in the recent occupy movement, which illustrated the imminent need to redesign current systems, in a way which could, and should, include large-scale reforestation stimulus.

## Safe-guarding human well-being

When comparing options for economic stimulus, we know ecological benefits are as important to human well-being and the future of geopolitical peace as economic benefits. Human well-being depends on biodiversity, clean air and water, precipitation patterns, soil stability, forest absorption of carbon dioxide, aerosols, chemical toxins and fertilizers, and of course, timber and fibre values.

Last summer's 100 days over 100°F and extreme drought burned 5 billion Texas trees which need replanting. However,

it is not always reforestation that creates ecosystem health. Texas grassland fire protection allowed mesquite to invade and there bioenergy removal can restore deep rooting, soil building, moisture holding, and long grass prairie ecosystems. Food, fuel and fibre security result from restoring each local climate driven forest and range ecosystem disturbances appropriately across North America.

To contrast the Alberta oil sands, the largest capital project in the world, which is dislocating hundreds of thousands of temporary tradespeople from across Canada, a national reforestation and soil restoration program could be distributed across Canada. A national, natural renewal program would not be lumped into short, urgent time periods rife with inefficiencies, boom-bust cycles or skill matching disconnects, but could be smoothed across time to match the professional development of the ecosystem restoration cohort deployed into the program.

In Canada, where natural resources are the province's responsibility, the federal government must help solve a national crisis that has hit one province exceptionally hard. BC is the logical place to start a national program, but this structural solution to change can apply to all of Canada's forests. Restoring ecosystems is critical for intergenerational equity beyond natural resource reasons, it is also important to help our youth confront challenges.

Longitudinal studies show chronic unemployment affects youth for entire lifetimes. Let us not stand by mute witness to North America's climate crisis in our forests and grasslands. Rising to the challenge of the largest ecosystem restoration project in the world is the best economic investment in intergenerational equity and sustainability. The Civilian Conservation Corps may not inspire the \$100 billion Facebook generation; we have to each re-ignite our own youthful imagination and will for adventure, and to remember how, during a global depression, President Roosevelt wrestled despair, dust storms and drought to a standstill from his wheelchair.

<sup>1</sup> An overview of the Lumber Industry in Canada, 2004 to 2010, Benoit Germain, Statistics Canada Catalogue # 11-621-M, no.

<sup>2</sup> 89ISSN 1707-0503 ABCPF Report on MPB management and restoration: 2012

# Publisher's Note

by Kate Menzies



With the launch of our first issue of 2012, I wanted to take a moment and share some new developments with our readers.

Subscription fees for accessing *Silviculture Magazine* are a thing of the past. In an effort to engage as much of the silviculture community as possible, to allow those readers to share content via email and social media sites and to further promote active discourse around topics covered in the magazine, all of the content, as well as a growing library of archives, are now offered for free. Spread the word.

You are encouraged to sign up on the homepage to our email list for notification when each quarterly issue is published; we all need reminders sometimes, this way you never miss an issue. To add the members of your association or large office to this listserve please email us.

We have revamped our website and will be publishing regular content between issues as well as offering space for job postings and events listings. Email [info@silviculturemagazine.com](mailto:info@silviculturemagazine.com) to place a job or event on the site. Don't forget to visit our Facebook page and 'Like' us and follow us on Twitter for links to up-to-the-minute content!

There is an open call for submissions from the field: If you're a planter, foreperson, supervisor, quality checker, brusher, thinner, pruner, cruiser, nursery professional, surveyor or other technician, we want to hear from you. Send us your submissions (750 words maximum). Share your insights, opinions or stories with the readers of *Silviculture Magazine* and/or showcase your photography skills!

In addition to these new changes, I'd like to introduce two new associate editors who will be preparing regular columns intended to broaden the scope of the magazine and represent new voices. Both have ample field experience which is bolstered by diverse interests and areas of expertise which will be reflected in their regular contribution to future issues.

Happy reading!

## Welcome Erin and Hugh!



**Erin Kendall** My earliest exposure to forestry happened during my first year of life, when I joined my parents at their seasonal job of tree planting. From the age of 15, I started on my own path in the forest working as a seasonal treeplanter, stand tender and surveyor. Over the course of pursuing a degree in Environmental Planning, I became interested in the interrelations of humans/forest – how forest dependent communities can engage with

the land to best meet the needs of the people as well as honouring ecological processes. A large focus of my study and work also began to centre around the First Nations communities of BC and developing culturally appropriate business models.

As my work in forest and stream restoration developed, the market for carbon offsets was becoming a viable mechanism for financing this work, where traditionally government programs and private

donations had been the primary funding sources. Excited about the potential of a market-based mechanism for placing a holistic value on ecosystem services, I continue to work at translating the languages of ecology and capital. My goal in this work is to develop self-sustaining projects that are financially, socially and ecologically viable in the long term.

With *Silviculture Magazine* as the vehicle, I'm excited to facilitate a forum for technical discussion of the silvicultural aspects of carbon projects pre- and post-implementation. This is something that I have found to be lacking - or at least diffuse - in my work and I think that the magazine can contribute significantly to the space by providing a forum for practitioners of forest carbon projects as they continue to develop best practices in methodologies, project management and monitoring, reporting and verification (MRV).

**Erin** has worked most recently with the Forest Carbon Group (Germany), ERA Ecosystem Restoration Associates and Brinkman Earth Systems. She holds a BSc in Environmental Planning from the University of Northern BC in Prince George. Erin has been involved, either directly or peripherally, on validated forest carbon projects including the Community Ecosystem Restoration Project (ISO, CCBS 2007), Denman Island Conservation (ISO/2011) and Darkwoods IFM (VCS/2011), as well as the documentary film *Fairy Kings - If Trees Could Talk*. Erin is currently based in the Deadman Valley in BC's Southern Interior, surrounded by beautiful grasslands, aspen, Douglas fir, spruce, pine and juniper and can be reached at [erin@silviculturemagazine.com](mailto:erin@silviculturemagazine.com).



**Hugh Stimson** As associate editor for *Silviculture Magazine*, I will be interviewing interesting people throughout silviculture and bringing those interviews to the magazine's readers in a variety of formats. The umbrella of 'silviculture' includes many kinds of people doing many kinds of jobs in many places, and their own perspectives on what they do and what could be done will be the focus. A particular interest will be the role of the working planter in a changeable labour market. Along those lines, I'll explore how ordinary treeplanters interact with modern Canadian forestry, and how modern forestry fits into an increasingly global understanding of how ecosystems and economies interact. I welcome manuscript submissions, ideas and feedback and can be reached at [hugh@silviculturemagazine.com](mailto:hugh@silviculturemagazine.com).

**Hugh** is an environmental geographer working out of Vancouver's Chinatown. Until recently he also spent his summers cursing, bleeding, sweating and freezing in the majestic clearcuts of BC and Alberta. According to the smudgy pencil in the back of various notebooks he has given over a million tree seedlings something like a start in life

Hugh has also worked in landscape and ecosystems analysis at UC Davis, the Smithsonian Institution and the University of Michigan, where he co-hosted "It's Hot in Here", WCBN's weekly environmental radio show.

# A Global Civilian Conservation Corps

By John Huizinga

In January 1933 the United States faced a dire emergency. They were in the depths of the depression during a catastrophic environmental disaster. The economy of the United States had collapsed and thousands of impoverished young men were without jobs or money and "riding the rails". A severe and prolonged drought had turned the Great Plains into a "dust bowl".

A newly elected President Roosevelt dealt with both emergencies by creating the "Civilian Conservation Corps". The mandate of the CCC was to reverse and repair the environmental damage caused by a hundred years of heedless exploitation by settlers, farmers, ranchers and miners, of the immense territories of the United States. The CCC consisted of up to 4500 camps all over the USA that housed the young men, not unlike Canada's tree planting camps. They planted nearly 3 billion trees, restored eroded lands, repaired degraded streams and wetlands and built the infrastructure (roads, hiking trails and administration buildings) for the newly created system of National Parks. By the end of the program in 1942, the CCC had employed over three million young men (Merrill, 1981). This undoubtedly helped stave off the social turmoil that could have resulted from having millions of young impoverished men, with their lives on the rails, vent their frustration and anger.

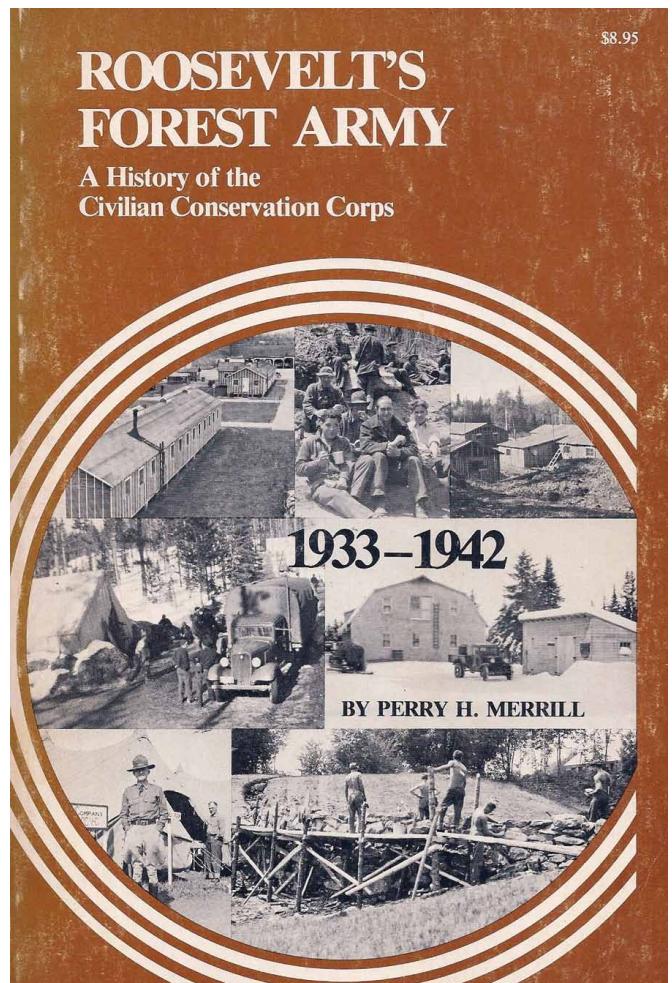
Eighty years later we again face an unprecedented global emergency. Throughout these eighty years, we have witnessed the entire world sustain severe ecological damage and unprecedented population growth, which has set the stage for widespread social disruption along with unparalleled land-use change and resource extraction. All over the globe massive deforestation, toxic industrial practices and globalized capitalist markets have severely degraded the ecosystems that sustain all life on earth.

Now, there is a new urgency for action; a changing global climate threatens to massively accelerate these environmental and social problems. The industrial processes we have created are not only damaging and disrupting the environment but changing the very composition of the Earth's atmosphere, as massive amounts of CO<sub>2</sub> injected into our atmosphere trap refracted long wave solar radiation and warm the entire planet.

There is an urgent need to respond to this global emergency.

In America, there are presently 158 service and conservation corps that engage over 250,000 community volunteers in work preserving natural resources; part of the modern conservation movement that has been emerging since the 1950s\*.

"Here is your country. Cherish these natural wonders, cherish the natural resources, cherish the history and romance as a sacred heritage, for your children and your children's children. Do not let selfish men or greedy interests skin your country of its beauty, its riches or its romance."  
~ Theodore Roosevelt





In November 2011, President Obama called for a 21st Century Conservation Service Corps in his America's Great Outdoors Report (<http://americasgreatoutdoors.gov/report/>) that will build on the important work already being done in the country, and provide America's youth with hands-on service and job trainings on natural public lands. This is undoubtedly a substantial and valuable commitment, however, today's challenges are global in scope and a new CCC that encompasses the entire world in a global effort is necessary to address the immediate and long-term threats to our collective well-being. A global, CCC work force would include young women as well as young men and would be inclusive to all peoples; empowering communities through skilled work and conservation efforts that serve to protect the global commons. Planting trees and performing ecological restoration will not only restore clean water, build soil fertility and control floods, but will sequester much of the CO<sub>2</sub> that now drives the warming climate. All intact and functional ecosystems also sequester carbon. Much of the CO<sub>2</sub> that is now being added to the atmosphere would be taken up by these improved natural processes and diminish the insidious blanket warming our planet.

Ecological restoration directly benefits the local people in the region. Intact ecosystems deliver natural foods, medicines, habitat for wildlife and the income from this restorative work would improve the lives of millions of impoverished people the world over. In the end, it would make for a more equitable and stable world.

A 21st century CCC could take young people from the world over who are unemployed, or looking for a sense of purpose, give them productive and meaningful work and the challenge would force them to learn new skills that they can apply for the rest of their lives. In the CCC

*"Today, Secretary of Agriculture Tom Vilsack and I announced an important step in the creation of a 21st Century Conservation Service Corps (21CSC), an organization called for in President Obama's America's Great Outdoors Report. We named members of a newly-established federal advisory committee that will provide recommendations on how to build on the important ongoing work of local, state, federal and non-profit youth conservation corps by engaging young Americans in hands-on service and job training experiences on public lands and open spaces."*

-Secretary of Interior Southwest Conservation Corps Ken Salazar

For full transcript of speech and more information, visit [bit.ly/zgmOlu](http://bit.ly/zgmOlu)

camps of 80 years ago, young people from diverse backgrounds lived and worked together, had the opportunity to learn to read and write (over 40,000 youth became literate as a result) and above all, they discovered that young people, be they from Maine or from Oklahoma, were just like themselves; all equal and all American. The CCC was a unifying force that helped to build a nation and it could now be used to solidify a global community.

The human tradition of young people setting aside a period of their life during which they become adults is, in some places, done in the name of public service within charitable institutions, in churches or in some of the armies of the world. With a Global Conservation Corps young people would be given the opportunity to join an ecological army of restoration workers who help create a better future for all humanity. Because of collective benefits of ecosystem health, much of the financing for this initiative would come from ecosystem value trading. But to engage our youth, this initiative will have

to be led by governments. The budget for a 21st century Global Conservation Corps' march to secure the future well-being of the planet may only be a small percentage of global military expenditures, as measures would be taken to ensure the activities of these young people would not be in conflict with, but would support, local populations. Not only is a global CCC easily affordable, in actual fact we, as a global society, cannot afford the costs associated with not restoring local ecosystems on a global scale. The time has come for a Global Civilian Conservation Corps concept to be implemented.

John Huizinga is a historian, treeplanter and reforestation project supervisor who has worked in BC, Saskatchewan and Ontario including with First Nations. He has also traveled and worked extensively internationally, including as a Project Administrator with Medicine San Frontier in Ethiopia, Georgia, and Azerbaijan, and on aid projects in Nepal, Ladakh and Mongolia.

References: Perry H. Merrill, Roosevelt's Forest Army, A History of the Civilian Conservation Corps (1981) p. 196.

\* According to The Corps Network website [www.nasc.org](http://www.nasc.org).

# Want to Plant More Trees This Season? Then Just Work Harder

By Dr. Alastair Hodges

The physical nature of reforestation work is painfully obvious to anyone who has spent at least one day working as a tree planter. Tree planters like to consider that the work is the most difficult job in Canada, and that the job is as physically demanding as running a marathon every day. But, perhaps due to the isolated workplace, there has been a relative paucity of data on the physiological, metabolic, or psychological demands of the work. Some previously published research describes the physical exertion, energy demands, and physiological stresses of the work<sup>3,6,7,8</sup> but recent work we published in the Journal of Occupational Medicine and Toxicology<sup>4</sup> last year attempted to investigate the elusive question of what makes some tree planters faster than others?

We measured heart rates on tree planters throughout a working day and video recorded workers on the cut block. The video was subsequently analyzed to determine the production speed (trees/hour) and the proportions of time spent planting each tree versus walking between microsites. The heart rate data was analyzed to establish a baseline exertion level through an entire working day including breaks, and the exertion level during an average bag-up. The data were then analyzed to answer the following questions: 1) Does production speed increase with experience? 2) Are faster tree planters exerting themselves more? 3) Are more experienced planters more efficient as measured by a lower heart rate for a given production speed?

We found that tree planters maintain an average heart rate of 115 bpm throughout the working day (figure 1) and a working heart rate during bag-ups of 128 bpm (figure 2). To put this in perspective, the average resting heart rate in a healthy, fit, young individual (such as our group of workers of average age 24 years) is between 50 – 70 bpm, and the average maximum heart rate of a 25 year-old is 195 bpm, meaning that tree planters work at an average of about 65% of maximal heart rate. In comparison, elite marathon runners typically maintain a heart rate of about 175 bpm (91% of maximal heart rate) during their race of just over two hours<sup>2</sup>, putting their exertion at about 80 – 85% of maximum aerobic effort<sup>1</sup>. Tree planters may not be working at a marathon pace, but their “race” lasts an average of 9 hours a day compared to just over 2 hours for a world-class marathoner. Running a marathon, it should also be noted, requires about 2,300 – 2,400 kCal<sup>5</sup> while the amount of energy a tree planter goes through in a day is slightly more than double that<sup>3</sup>. Tree planters might not work as intensely as marathoners, but they do work harder and longer day after day.

Not surprisingly, we found that more experienced planters had a higher production speed than less experienced planters (though we only had 3 rookies in our data, we had an experience level that ranged from 1 – 9 seasons). Production speed also increased with

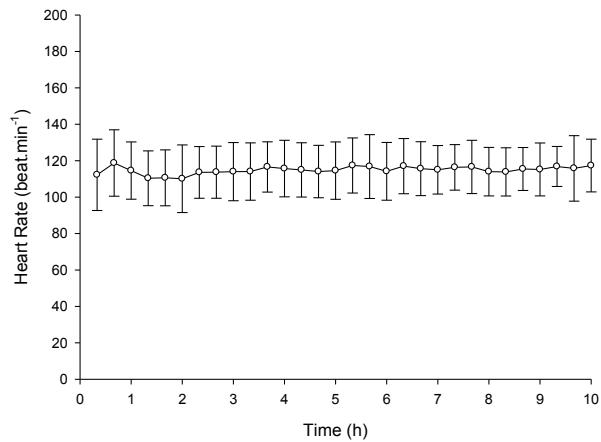


Figure 1. Mean ( $\pm$  standard deviation) heart rates during a full day of tree planting work (n = 19).

working heart rate (or exertion). This latter finding is not necessarily intuitive. Although hard work typically pays off, anyone who has watched a smooth veteran outpace a struggling rookie might think that exertion actually decreases with experience, but we found the opposite. Finally, we also found that the exertion level for a given production speed was lower for more experienced planters. This means that with experience comes efficiency. More experienced planters don't struggle as hard for each tree as less experienced planters do, even though overall they seem to exert themselves more. This is not surprising, but it does combine with the finding of increased exertion in more experienced planters to tell an interesting story.

More experienced planters clearly plant more trees than their less experienced comrades. They are also more efficient at putting trees in the ground. But, their increased production doesn't only stem from increased efficiency. More experienced planters simply work harder. This is not necessarily a snub of the motivation and effort of less experienced planters. Rather, we hypothesize that with experience comes the ability to work harder because less time is spent wandering around looking for that next spot. Unfortunately, the video analysis of time spent planting trees versus looking for microsites does not support this theory, but it does not contradict it either. According to our findings, the average tree planter spends 53% of the time planting trees versus 47% walking between trees and, surprisingly, this ratio does not change significantly with experience level. A finding that more experienced planters spend less time walking between trees would have nicely supported the theory that veteran planters are more efficient at finding microsites

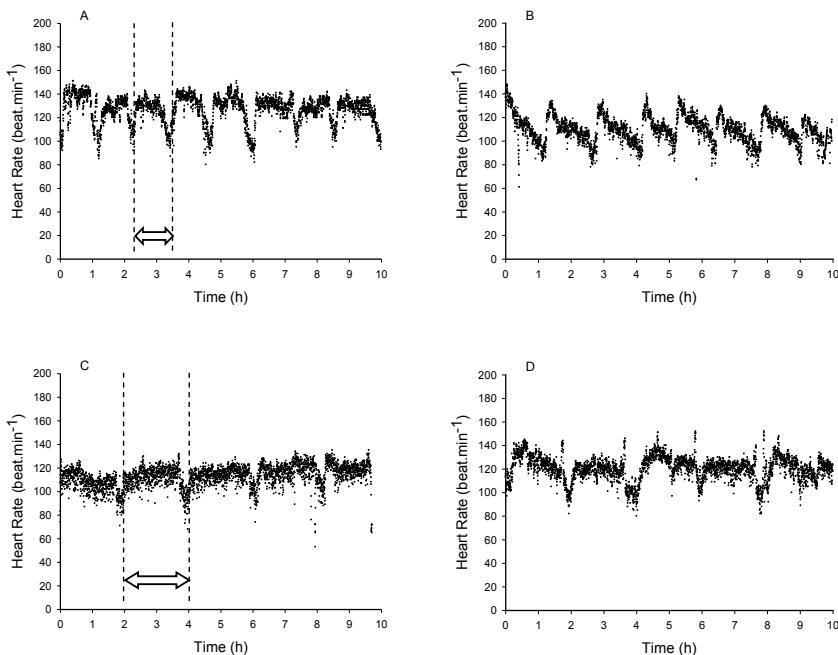


Figure 2. Sample individual heart rate responses during 10 hours of tree planting work. Panels A & B: experienced tree planters (4 and 5 seasons experience respectively). Panels C & D: inexperienced tree planters (both during first season of work). Dashed lines on panels A & C denote one bag-up.

and are therefore able to maintain both a higher exertion level and production speed. But, we suggest that the reason this ratio is not variable with experience is that more experienced planters are equally faster at both skills: walking between microsites and the mechanics of putting a tree in the ground. The fact that both exertion level and production speed are higher in more experienced planters seems to support this.

Production is the bottom line in tree planting. Anyone who has spent any time at all on a tree planting crew knows that everything else, including occupational health and safety, environmental regulations, and stock care and handling, can end up taking a back seat to production. Being able to slam in an extra couple of hundred trees each day is worth hard cash to the worker

and the contractor, and ultimately benefits the client also. But as long as the only solution to making more money is to work harder, as suggested by our findings, tree planters will find ways to work harder and harder to make ends meet, even when it leads to compromises on other values, including their own health and safety. It will take significant industry leadership to recognize and reward those contractors who place a priority on worker health and safety (which could impact production) and penalize those who don't. Thus far, unfortunately, the industry seems to have followed the opposite philosophy.

So, how can tree planters increase productivity? As so often happens with research, the answer appears obvious

(work harder) while the explanation remains elusive. But, for now at least, acquiring the skills to increase pay appears to require a lengthy and often painful apprenticeship in the bush repeatedly turning soil with the business end of a shovel. ¶

Dr. Alastair Hodges is an exercise physiologist in the Department of Kinesiology and Physical Education at the University of the Fraser Valley. He worked as a tree planter, crew foreman, and supervisor from 1990 – 2006 in the reforestation industry in Northern British Columbia and Alberta.

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# Notes from the Field

## Planter's Exodus

By *Shelby Leslie*

Planting has been my primary source of income for the past eight years. I started off a wonder-struck idealist at the tender young age of 17. I'll admit, most of the wonder, and a good part of the idealism has been ground out in these past eight years. Yet I come back year after year, for better or for worse. Planting enabled me to travel the world, and fund my education. It has provided me with the economic freedom to do as I please and for this I am truly grateful. Yet it would seem that at age 25 and with eight years experience, I am, according the numbers, past my peak and forecasted for bodily decay and a new job.

Statistics from the 2011 Interior Contractor's Summit (available at [www.wsca.ca](http://www.wsca.ca)) illustrate a decline in age and experience of the average tree planter; 85% of the work force is between the age of 19 and 30. Furthermore, according to the same report, 30% of the workforce has only one year experience. These numbers were said to be indicative of the industry's overall trends. What's happened to those veteran characters who were the backbone of any tree planting camp? Here are some ideas I have to explain the exodus of experienced planters:

1. The seasoned vets (ten years plus) normally have a litany of aches and pains requiring constant management and therapy at their own expense. This can take a heavy toll on their average annual income of about thirty thousand (supplemented though it may be, by 22 weeks of EI). Add to this the fact that, at this point, there's no real hope for pension plans so they'll have to keep it up for another 30 years.

2. They graduated from university/ college/trades school and got a job that offered the aforementioned pension, or at the very least a much higher salary for less back-breaking work.

3. They went to the dark side (the oil fields).

4. They invested their money wisely in real estate.

5. On their 30th birthday, their mom and dad came into their basement bedroom and said, "Surprise, you're the princess of Monaco!"

6. Things just get weirder from here.....

While some of these scenarios are more likely than others, for the majority of people, tree planting is not a sustainable lifestyle. Planters make up the base of a gigantic pyramid known as the "natural resource extraction temple-machine of Canada. While I accept the nature of capitalist economics and international markets, it's hard not to feel a bit shafted. One might imagine there's a rapacious little weasel in a sweater vest, pinching pennies off the tops of our trees. Of course this is not the case, but you get the point; planting isn't as full of sunshine, rainbows and unicorns these days.

Tree prices are going down; figures from the 2011 report indicate a four cent drop from 2001 to 2010. Combined with the effects of inflation, we see a wage decrease of nearly 30%. In spite of this, the number of trees being planted (at least in BC) is increasing. We now have more trees being planted by less experienced planters for less money.

On top of this, we're told that there are too many injuries and claims in our business, most of which are related to MSI and slips, trips and falls. When you consider the mechanics of planting thousands of trees

per day on a cut block, for 3 to 6 months of the year, it's not a surprise that these injuries are occurring. Now, however, there is an increasingly stringent methodology "fit to plant" being pressed upon planters, which demands a lifestyle adjustment to accommodate their seasonal job; an audacious idea yes, but a relatively tall and somewhat unrealistic order.

So where do we go from here? With the volume of trees on the rise, hopefully dragging up tree prices with it, there is hope for us planters. Over the past 40 years we have founded a strong sub-culture that has become a pillar of Canada's natural resource industry. Having hit rock bottom, there is the potential to reinvent ourselves within the framework of the 21st century industrial standards. How and what that will look like is still to be determined, but one thing is certain; none of these goals will be achieved without the retention of an experienced workforce.

Shelby has been planting, crew bossing and running trees in Ontario, Alberta, interior BC and the coast for the past 8 seasons. He writes from his home in Vancouver and can be reached at [shelbyleslie@gmail.com](mailto:shelbyleslie@gmail.com).

## Message to Family, From Camp

By *Leigh McLaughlin*

This is from my 1st month tree planting in Dryden (I was 18 at the time)

"Family;

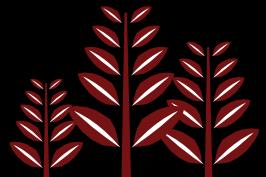
We had a hotel night last night. The floor was where I ended up anyway. At least it was dry, and, relatively warm. I'm working really hard. Singing gets me throughout the day...the bugs are out...I think I do it not only to distract my wandering mind, but to drown them out.

They're brutal...full body bug net prevents my eyes from swelling completely shut. I've made 1500\$ so far, grosse. Not bad. I'm going for 5000. Have to plant 2000 trees a day. It's very doable. There are moments, here, when I feel uncomfortable. No wishes of death or home.

Just wining, and fuzz. Most of the time, loves, I'm feeling so thankful for this

opportunity. This is one of the best decisions I've ever made. I have the best moment of my life one day, and the next, I have moments that top the previous. I'm confident I can do anything if I don't give up on this. It's so very hard. Not only physically (wrotten feet, swollen body from bugs and sun or too much rain, nails becoming soft, and falling right off, enflamed knuckles)...my bum, looks the best it ever has.

Click click click, computers and tree planters all around me. We ARE all like family. I love these people so much. They're all different. All came here for their own reasons. (My man is here. My plutonic soul mate it seems. He's a great guitarist. From the other camp, merged. We are all one big dirty, crusty eyed, sun baked family.) I want to send you a letter on birch bark, soaked in my sweat (haven't been wearing deodorant, or makeup. I smell like an off colour flower, and my skin has never been so clear (apart from the bug blisters). It is amazing up here. Planting 2000 will be hard. I find myself caught up



in the beauty of the sky. The wind in the trees, or the rain bringing out colours I could never have conceived. The air smells of new life, and lilac, and bark. City life is not for me. I knew, but now I know. You know? Maybe its just a good group.

The food is really good. They cater to vegetarians. I don't know what else to say. Except that I love. I love. That's all there is. Peace in my physical anxiety. I know I have to go another 6 days, starting in a matter of hours. Lugging 50 lbs of trees, many kilometres, to the back of my land, then working forward. Then grabbing another 50lbs...over and over and over, and over. My shoulders are strong. My legs and my hips too. My arms look like Madonna's. People say I look like her...the French...but the English say, Uma Thurman. But they

know I'm me. We all seem to appreciate one another for all that we are. I have never felt better about myself. Vanity, goodbye.

Seriously. I find I feel more beautiful, with dirt on my face, work boots and a bandana than when I'm clean and caked with makeup.

These people travel. These people bring to me ideas that need to be investigated. These people are me. And I am the bugs, and the rain, and the toe wrott,...the blisters, the earth, and the affection. I find bugs very fascinating. No need to kill any of them ne more. My tent was infested the other night. They ate their fill, and I left my flap open for them in the morning.

No days off. Obligations. Taking care of myself. Working for myself. Motivating myself. But a current pushes. Ceaseless.

Our eyes are rainbows in the sun and moonlight. Our hair is matted. We push and push and cry on our own in the middle of the day, alone on our land, forehead to shovel handle, hunched...bug cloud gathers, and we are forced on...licking up the tears for the salt we forgot to sprinkle into our water in the morning.

I love you, family, hope you're all doing amazingly"

Leigh McLaughlin is a recent graduate of OCAD University. Her first planting season, 2007, took place in Redlake, after which she participated in the summer plant in Troutlake. The following year, she ventured to B.C., planting in Kelowna, Williams Lake, Prince George, and Mission.

## The Acute Details of Planting Trees

By Amy Attas

Time is more important during a tree-planting contract than in any other phase of my life. We count each week that brings us closer to peak performance, and then each week that brings us closer to being done. The coming of June is always celebrated, since it's the month us Ontarians are freed from the work. Within the week we count off the two nights to hump day, then the three days to the weekend. I put a stopwatch on every bag-up, trying to get each load of five hundred trees into the ground faster than the last. I race to eat oranges faster than my partner – less than ten seconds if I bite it in half (peel included) then suck out the fleshy innards with my bottom teeth. There's a fast way and a lowballer way to unwrap the seedlings, the highballer standing-up breakfast, the speedy pajamas (yesterday's and tomorrow's work clothes).

Tree planting has taught me more about my body than any science class or personal trainer. It takes two weeks for skin to turn to leather. In the first week, roots, rocks and truck gates leave scratches that burn acutely for three days. The damp/dry hell of hands repeatedly dipped in soil moves in next, and farm-grade cow udder cream brings only temporary relief. It's hard to fall asleep. But then, on the morning of the fourteenth day, the pain is gone. Without

fail. Fourteenth day, every year. Skin stronger than gloves, last year's calluses rising up to meet the shovel handle after a year in hibernation. Feet suffer their own training regimen. A day in the swamp leaves them wrinkled and white, so in the evening I wear sandals (even in sub-zero temperatures) until the skin is dry, puffy and smooth. By the next morning they'll be recovered, unless they're forced back into wet boots. Then career-ending trench foot will take hold in the form of permanent red blotches. Unless you're the company highballer, in which case career-ending trench foot just gets you a plethora of spare boots and socks from the boys in camp (yes, the company highballer is a 110lb girl, personal best 8900 trees (\$900) in twelve hours).

Hunger is an animal unto itself. For the first week it is AWOL, stomachs clenched to a tight fist, anxiety and overwhelming work making eating a chore. In Week Two the cook may coax us with some soup for breakfast, then in Week Three we rejoice in guilt-free calorie crushing. I eat a heaping bowl of fresh fruit and yogurt followed by five pancakes or a full plate of eggs and hash browns. I pack a lunch of three sandwiches, three cookies, two apples, two oranges, one bag of celery and carrot sticks, and one of the cook's famous homemade granola bars (plus eight litres of water and two litres of Gatorade). At dinner I'll have three scoops of shepherd's pie and green beans, or a six-by-six inch

piece of lasagna with salad and garlic bread, plus dessert. There's always dessert.

I usually lose about ten pounds. I don't feel much stronger, though I am more effective in the land. Some of the softer men will lose thirty pounds in a matter of weeks. One day's sunburn is the next day's sunscreen. The first blackfly bite of the year usually swells to the size of a marble. I've had eyes swollen shut. I've heard of planters throwing up from their venom. By the end of the contract we can't feel them bite and don't notice the itch – unless our long john's get a pin-sized hole and thirty blackflies take advantage. Men grow bush beards, women grow bush legs. No one notices unless we put on bathing suits, but even then most eyes are distracted by the weird tan lines.

Before the contract a good night out might mean seven beers. That's laughable by mid-season. That's an afternoon's drink menu while floating on a raft purchased at a small town dollar store. We don't know the stories to our bruises, there are so many across our bodies.

The changes are all met with pride. We like our bodies. They allow us to plant trees.

Amy has seven year's tree planting experience in Ontario; five as a planter and two as a quality checker. This year she'll be planting in BC. Her book "j-rooted" is currently soliciting a publisher. She can be reached at [attasamy@hotmail.com](mailto:attasamy@hotmail.com).

# Combined Heat & Biochar: A Revolution for Greenhouse BioEnergy

Words & photos by Scott Scholefield, MSc, RPF





In the October 2011 issue of *Silviculture Magazine*, John Kitchen makes a sensible argument for turning to woody energy crops as a source of clean energy. Many people from around the world share the excitement for biomass potential to supplement our energy needs. For greenhouse growers and seedling producers, energy costs and productivity are top of mind. Combined heat and biochar (CHAB) reactors are a sustainable heating and soil amendment solution that together, can reduce costs, increase crop productivity, seedling survival and carbon sequestration while demonstrating a corporate commitment to sustainability.

Touted as 'carbon neutral', conventional woody biomass heating systems for greenhouse boilers burn chips or pellets to generate heat, producing waste in the form of air emissions and ash. In contrast, carbon-negative CHAB systems thermally decompose biomass in limited oxygen environments at high temperatures. Processes of pyrolysis or gasification result in a high-carbon product known as biochar and capture emissions as bio-products (oils and gases). While woody biomass is a common feedstock, sustainable CHAB systems may also reduce input costs by utilizing excess crop residues, municipal stream wastes and recyclables, construction materials and manures. Further converting bio-products and heat to electricity makes for exciting possibilities.

"Bio-energy through pyrolysis in combination with biochar sequestration holds promise for obtaining energy and improving the environment...for every unit of energy produced or possibly even consumed, greenhouse gases would be removed from the atmosphere. This could be the beginning of a biochar revolution..." Johannes Lehmann et al. 2006

The body of science surrounding biochar production and application are now

expanding rapidly. The International Biochar Initiative (<http://www.biochar-international.org/>) is an organization leading efforts worldwide. Canadians like Lloyd Hefferty have been instrumental in raising awareness and developing national and regional biochar networks like the Canadian Biochar Initiative ([www.biochar.ca/](http://www.biochar.ca/)).

Biochar is not new. In fact, use of biochar by ancient civilizations has been found where infertile soils were transformed into productive agricultural land. Rich dark earth containing biochar have been documented dating back tens of thousands of years. Asian farmers have been using biochar for centuries. Biochar improves soil fertility by increasing water retention, availability of air, nutrients and soil amendments used by plants and crops.

More recent research trials of biochar in greenhouse pots and poly blocks have demonstrated significant gains in plant growth, root development and crop production. Research is underway to evaluate the inoculation of biochar with soil biota and beneficial mycorrhizae. Reduced fertilizer use and substitutions for non-renewable soil and soil-less mixtures make biochar on its own an attractive addition to greenhouse operations. The feather-light weight of biochar makes it cost effective and easily transported.

As awareness of biochar and CHAB furnaces builds among greenhouse growers, there are several challenges to overcome. First, there are barriers to investment. With strongly developed distribution networks for fossil fuels and a relatively low investment requirement for traditional greenhouse furnaces and boilers, the incentive to adopt CHAB systems may be invariably low for operators who cannot make an investment. That said, a variety of funding programs do exist to help supplement investment. Upfront costs





must come down. For many existing greenhouse operators a return on investment beyond three years is unacceptable. Also, we do not have systems in place in many parts of the country to support the diversion of biomass from landfills or traditional waste streams that would allow for the efficient collection, drying, processing and delivery of biomass to where it is needed. It is critical for proponents to secure a biomass feedstock supply pairing availability with the CHAB system. Transportation and service logistics must be thoroughly evaluated before committing to the technology purchase.

Secondly, many CHAB reactors are presently in research and development phases with new products coming on line in 2012 and beyond. As the demand for CHAB systems increases, advances in technology, availability of feedstock and systems to support these ventures will be advanced. This is especially true for small operators whose current CHAB offerings are limited. Most successful projects are characterized by joint ventures, partnerships and collaboration. It is with great hope and excitement that the biochar community can together help address some of the world's most serious environmental challenges, while providing a greener way of growing. †

Scott Scholefield, RPF is Director, Business Development at Out of Ashes BioEnergy Inc. whose company vision is to become a leading supplier of biomass heating solutions for greenhouses with a range of organic biochar available for purchase under our boutique brand, Turtleback Biochar®. For more information please visit [www.turtlebackbiochar.com](http://www.turtlebackbiochar.com).

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# Focus on Safety

By Laura Maguire

## Rubber side down, productivity stays up!

Have you been ignoring those planters who work in running shoes? Did you shrug off that knee injury claim that lasted 50 days because it's the 'name of the game'? Do you high five the planter who runs off the block to fit in one more bag up?

Slips, trips and falls are the number one cause of workplace injuries in the silviculture industry. Between 2006-2010 they represented over \$82 million in claims costs for forestry companies!

If you have ever had a worker roll an ankle or twist a knee due to a misstep on the block you know that the cost of the claim is only one part of the total expense to your company – there is downtime to deal with the injured worker for your first aid attendant, foreman and supervisor; lost production capacity while the worker is out of commission; extra recruitment and training costs to bring in a new planter and one more thing to deal with in an already busy season!

Slips, trips and falls happen when a planter loses their footing on an unstable surface or makes contact with a branch and compromises their balance. Poor footwear, weak supporting musculature, overloaded bags and moving too quickly can all contribute to these types of injuries.

Tips to prevent slipping, tripping and falling on the block:

**Make Fitness a Priority** Many of our workers arrive out to the field undertrained for the start of the season. You may wish to offer support (in the form of gym passes, incentives or send information on workout plans) to encourage participation in cardiovascular fitness and strength training programs in the months before to start up. Programs such as the Fit to Plant by Dr. Delia Roberts offer silviculture specific training. Both Men's Health & Women's Health magazine offers iPhone apps with strength training workouts. For

local workforces, consider encouraging crews to play recreational league sports (dodgeball anyone?) for team building and fitness opportunities.

**Practice Good PPE** Footwear appropriate for the type of ground being planted is critical to keeping your planters on their feet. Assess the terrain to determine how much ankle support is required, how aggressive the tread should be, if caulk should be used and how durable the boot material needs to be.

**Focus on Education Around Self-Care** Adequate rest, good hydration and proper nutrition help ensure your planter is able to prevent a stumble from becoming a fall. Each worker will make their own choices around how they spend their downtime but education in the form of safety meeting topics, reading material at camp and in the crew trucks and coaching/mentoring from experienced planters will help planters understand the full impact of their decision to stay up late or rehydrate with fizzy fluids.

**Show Me the Money!** Piece rate workers are motivated by their ability to produce. Draw the connection to the dollars to help support your efforts in an injury prevention campaign. Studies that show a decrease in performance with athletes could be used to show how it may impact a planters earning power. For instance, a 10% drop in production over a shift may mean 500 less tree's planted. At 22 cents per tree that planter is missing out on over \$100 of income!

## Outsource Your Injury Prevention Efforts

The BC Forest Safety Council offers information on slips, trips and falls and other injury management strategies. In spring 2012 the Council will offer an info package and webinar on training your workers on slips, trips and falls hazards and ways to improve your SMS to deal with this issue. If you don't see what you need,



Photo by Eric Gesinger

ask! They are there to assist your company. WorkSafe BC also has a number of resources on ergonomics, stretching, prevention tools and claims management support. Look to other industries for help on how they deal with challenges around slips, trips and falls in the field, working around equipment and on the shop floor. General safety information should be adapted to fit your crews and your company's safety management system for best results.

Laura worked in the silviculture industry for 11 years. She now brings her field experience to helping companies create practical solutions to their safety issues and wishes she could have taken her own advice when she was putting in trees. She can be reached at [Maguire@bcforestsafe.org](mailto:Maguire@bcforestsafe.org).

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# Western Canada

By Jordan Tesluk

## Using SAFE Companies Audits to Evaluate Contractors: Words of Caution for Licensees and Contract Administrators

I have recently spoken to several contractors that have been asked to provide their SAFE Companies audit reports to clients, to assist the client in evaluating the contractors' safety program. When selecting and hiring a contractor, a company can rest assured that a valid SAFE Companies certification demonstrates the potential contractors' success in achieving a standard<sup>1</sup> set by the industry. However, the audit program was not designed to provide comparable numerical scores by which companies can evaluate and select their potential contractors, and was not intended to provide extensive details of company operations to third parties. Requiring contractors to submit their audit report may seem like a convenient way to obtain a large amount of detailed information, but one should be cautious about doing this for several reasons.

First, there may be subtle variation between auditors. Large companies (BASE companies in British Columbia) require an external auditor to complete their reports at least once every three years<sup>2</sup>. When reading and evaluating an audit report, one is also judging the attention to detail, communication habits, and perspective of the auditor. The BC Forest Safety Council has taken extensive steps to ensure consistency of audits, including ongoing auditor training and conferences, extensive review of audit questions and guidelines, and careful review of audit reports by Council staff. However, there remain subtle variations between auditors in the ways they conduct audits and write reports. This may translate into occasional differences in the scoring of one or two points in the audit, or may be apparent in the tone of the report and the words chosen to describe the company safety program. There may be particular differences in continual improvement comments, which are not intended to serve as orders to the company but instead function as suggestions on potential ways for companies to improve in the future. Furthermore, the audit represents only a sampling of operations and personnel and a single moment in time, and may not always capture everything that is occurring in the company. Therefore, one must be mindful of these sources of subjectivity when considering reviewing an audit, and be cautious about comparing one company's audit report with that of another.

Second and more importantly, the audit process relies upon a relationship of trust and transparency between the auditor and the company. One of the great strengths of the audit process is that companies feel comfortable with an in-depth review when they

know they will not suffer any prejudice based on what the auditor finds. In my own experiences as an auditor, I have had several contractors bluntly tell me that they want me to be brutally honest with them and be as picky as possible because they want to find potential deficiencies in their audit report so they can repair them immediately, rather than discover the issues during incident reports or WorkSafeBC inspections. However, if companies are forced to provide their audit reports for the purpose of evaluation by clients, the auditor-company relationship may become compromised, and companies may become less forthcoming with their auditors for fear of report findings coming back to haunt them later.

This does not discount the audit as a valuable source of information. As mentioned previously, a successful SAFE Companies certification indicates a company has met a rigorous standard set by the industry. If a company wishes to go further in evaluating potential contractors in relation to the audit, perhaps the most insightful method is to ask contractors about their corrective action processes and plans for improvement based on their audit recommendations. Requesting a company's audit executive summary and the corrective action log (or improvement plan) can provide a useful and insightful window to their safety program, without involving the aforementioned subjectivities and caveats involved in a lengthy review of their entire audit report. This limited focus draws both the company and the contractor into a meaningful discussion in which they can share information about workplace safety and maintain an emphasis on the improvement process, without compromising the original intentions and learning relationships inherent in the SAFE Companies audit. I strongly encourage companies to talk to their contractors about safety improvements, but to exercise discretion in the tools that they reach for in achieving this desirable objective.

Jordan Tesluk is a certified external auditor licensed by the BC Forest Safety Council. He also serves as an industry consultant providing input on safety program development to the WSCA and the BC Safe Silviculture Project. He can be reached at [jordan@symbioticsolutions.ca](mailto:jordan@symbioticsolutions.ca).

<sup>1</sup> For BASE companies, this is set at 80%.

<sup>2</sup> Many companies have an external auditor review their company every year, in order to obtain a critical and objective evaluation of their program. During 'maintenance' years in the second and third year, BASE companies may complete their own audits, and these must be examined differently than audits performed by external auditors who possess no vested interest in the company, and remain objective to the outcomes of the audit process.



# Ontario

*By Lynn Palmer, PhD Candidate, Faculty of Natural Resource Management*

## **Will Ontario's New Tenure System Support Community-Based Forest Management?**

Ontario's Forest Tenure Modernization Act created two new forest governance models for sustainable forest licences: Local Forest Management Corporations (LFMCs) which are Crown agencies and Enhanced Shareholder SFLs. Over the next 5 to 7 years, the province plans to establish two LFMCs and make a significant shift from single entity and shareholder SFLs to Enhanced Shareholder SFLs. Evaluation criteria will be established to assess both models during this pilot period. The government has indicated that continued engagement of all stakeholders and Aboriginal people will occur for the development of the evaluation criteria and the detailed design and implementation of both models.

Will the new approach will work for communities? The previous tenure system, which licensed timber only to commodity forest industries and involved a minimal diversity of actors and forest products, systematically failed to generate progressive, forest-based development in northern Ontario. Because the system was set up to take revenue out of the region, it led to dependent and unstable rural economies in both municipalities and First Nations. Communities were alienated from decision-making on matters fundamental to the economic, social and cultural future of the north. Constitutionally-recognized Aboriginal and treaty rights in Canada were largely ignored by the province when issuing licences to the forest industry on First Nation traditional territories.

The development of a new forest tenure system was a driver for many communities in northern Ontario to advocate for community-based forest management (CBFM). This contemporary forest governance approach has been an increasing global policy trend for the past several decades. Extensive research worldwide has indicated that CBFM results in more equitable and sustainable management of forests than the conventional approach, when appropriate forest governance institutions including tenure security and local decision-making power are in place.

A number of CBFM initiatives have thus emerged as partnerships between First Nations and municipalities with distinct histories and cultures, but who share a dependence on the same local forests for their livelihoods and culture. Associated with these initiatives is the desire for local control of forests, community economic development, best end use of forest resources, and recognition of Aboriginal rights.

The partnerships exemplify that all northern Ontarians are treaty people with rights and interests in their local lands and that positive relationships can be built among all types of forest-dependent communities based on respect for the treaties. These community forest initiatives hold the promise of diversifying the northern forest economy by placing decision-making in local hands. Their success will require recognition and facilitation by the Province of Ontario through the new forest tenure models. Yet several key concerns about the new tenure approach remain.

Both new tenure models will have boards of directors. LFMC board members will be appointed by the government and will include local and Aboriginal representation while Enhanced Shareholder SFLs will have a shareholder board of directors that the government suggests will include meaningful local and Aboriginal community involvement. It is unclear precisely how community board members will be selected for either model to ensure that local communities will obtain decision-making power in local forest management.

For community forests to succeed, it is crucial that they retain the revenue they generate. Only then can they achieve real economic development; increasingly productive, happy, self-governing people that result from the accumulation of human, social and physical capital while the renewable natural capital - the local forest - is maintained. While LFMCs will get to keep the revenue, this is not the case for the Enhanced Shareholder SFLs.

The CBFM initiatives are focused on the development of community-based forest enterprises based not only on timber but also non-timber forest products (NTFPs). However, the new tenure system is still limited to the harvest of timber. There is no mention of other forest values such as non-timber resources for diversification to promote community economic development. There are still no regulations in Ontario governing NTFPs, many of which are part of the historic land use patterns of First Nations and therefore integrally tied to Aboriginal and treaty rights.

While the Ontario Forest Tenure Modernization Act provides a small window for community forest initiatives, it remains to be seen whether the revisions will be sufficient to support their success. However, given that many northern Ontario communities are taking steps on their own resulting in stronger relationships and innovative ideas for forest management, further influence on government policy is likely.

# Québec

par Shanie Lévesque-Baker, Association Des Entrepreneurs en Travaux Sylvicoles Du Québec

## **Modification du travail sur les sites de reboisement**

Depuis l'été 2010, les entreprises de reboisement voient graduellement leur méthode de travail modifiée. En effet, la Direction générale des pépinières et des stations piscicoles (DGPSP) a amorcé un virage important dans le mode de livraison des plants de forte dimension : les entreprises reçoivent dorénavant leurs plants directement dans les récipients (caissettes), plutôt que dans les bacs auxquels elles étaient habituées.

En éliminant ainsi l'étape du transfert des plants en caissettes vers des bacs, la DGPSP visait une meilleure qualité des plants à leur arrivée sur le chantier, tout en diminuant les coûts du processus de production. Cependant, les répercussions ont été toutes autres sur le terrain, et les impacts se sont rapidement fait ressentir. En effet, les entreprises touchées ont noté une baisse de productivité dans le processus de manipulation des plants, de l'arrivée jusqu'au dépôt aux reboiseurs.

Mis au parfum, le Bureau de Mise en Marché des Bois (BMMB) a ainsi mandaté une équipe pour réaliser une étude sur le terrain, et documenter cette problématique et ses impacts. Pour ce faire, ce sont cinq entreprises du Québec (régions de l'Abitibi, du Lac-St-Jean et de la Mauricie) qui ont participé à la cueillette d'information.

L'étude a permis d'identifier les impacts du changement du mode de livraison des plants auprès des entreprises, en mesurant la perte de productivité et la hausse des coûts reliées à l'augmentation des besoins en main-d'œuvre et en machinerie. En effet, le nombre d'allers et retours effectués pour livrer les plants jusqu'aux reboiseurs a augmenté, dû à la quantité moins importante de plants transportés en récipients plutôt qu'en bacs et ce, pour la même surface occupée sur la remorque de transport.

Sensible à la problématique, le Ministère des Ressources naturelles et de la Faune planchera sur une solution afin d'aider les entreprises à mieux planifier leurs ressources, pour s'adapter à ce nouveau mode de livraison des plants de forte dimension.

## **La biomasse forestière au centre d'un débat musclé**

En novembre dernier, l'organisme environnemental Greenpeace publiait le rapport « De biomasse à...biomascarade », portant sur l'utilisation de la biomasse forestière à des fins énergétiques, et dans lequel on y somme les gouvernements provinciaux et fédéral de ne



M. Nicolas Mainville Photo: AFVSM



M. Patrice Mangin Photo: AFVSM

pas se lancer tête première dans cette nouvelle forme d'énergie.

Afin d'attiser les discussions, et de permettre une réaction à ce document, une rencontre a ainsi eu lieu entre l'auteur de ce rapport, M. Nicolas Mainville, et le professeur universitaire M. Patrice Mangin, très actif dans le secteur des pâtes et papiers. Près d'une centaine de personnes ont pris plaisir à entendre plaider les deux intervenants lors d'un dîner-débat organisé conjointement par l'Association forestière de la Vallée du Saint-Maurice et l'Alliance des chambres de commerce de la Mauricie, le 14 décembre dernier.

Tandis que l'un s'inquiète de la bonne volonté de l'industrie forestière pour une utilisation adéquate des ressources forestières et doute de la valeur ajoutée de cette source d'énergie, l'autre martèle que les principes de développement durable seront respectés et prône le modèle d'un cocktail d'énergies renouvelables qui comprendrait notamment la biomasse forestière.

Plusieurs litiges étaient au cœur des discussions : la conservation des forêts et le respect des possibilités forestières, la quantité d'énergie totale produite et la création de richesse et d'emplois, même la notion d'activité carboneutre a été remise en question.

Il est clair que le débat est loin d'être clos, et seul l'avenir nous dira comment l'industrie de la bioénergie saura composer avec la pression des groupes environnementaux tels que Greenpeace, et espérer se tailler une place de choix dans la filière énergétique.



# Quebec

translated by Teri Shaw

## Modified work on reforestation sites

Since summer 2010, reforestation companies have implemented modifications to their work methods. The Director General of Strategic Policy and Planning (DGSP) has taken a new direction with the stock delivery methods used for large tree plants: companies will now be receiving their large plants in their original boxes instead of in the cases that they have become accustomed to receiving.

By eliminating the step of transferring the plants from boxes to cases, the DGSP aimed to deliver a higher quality plant at their arrival on site, as well as to reduce production costs. However, on site, the repercussions of this change were not anticipated and were far reaching. In fact, companies reported reduced productivity in the process of plant manipulation from the plants arrival to their delivery to the planters' depot.

As a result the Bureau of Marketing of Wood followed up by mandating a team to complete a study of the grounds and to document this new challenge and its impacts. Five Quebec-based companies (from Abitibi, Lac St. Jean, and the St. Maurice River regions) participated in the collection of information for the studies.

The study allowed researchers to identify the impacts of new methods of transporting plants to companies, by measuring the loss of productivity and the increase in costs linked to increased labour and machinery requirements. They found that the number of return trips made to deliver plants to the foresters increased due to the reduced quantity of plants transported in containers rather than boxes. The effect was the same when measured against the area plants occupied on transport trailers.

Sensitive to the issue, the Ministry of Natural Resources and Fauna is working on a solution in order to help companies better plan their resources and adapt their transportation practices to be more feasible for large-sized tree plants.

## Forest biomass in the center of a heated debate

Last November, the environmental organization Greenpeace published the report "From Biomass to Biomascarade" on the use of forest biomass for energy purposes, and in which Greenpeace calls upon provincial and federal governments to not launch head first into this new form of energy.

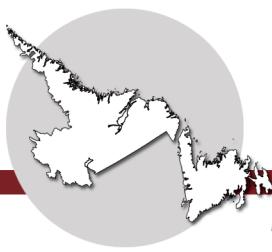
To stir up public discussion and to allow for a response to this document, a meeting has taken place between the author of the Greenpeace report, Mr. Nicolas Mainville, and university professor Mr. Patrice Mangin, who is very active in the sector of pulp and paper. Nearly a hundred people had the pleasure of hearing the duo plead their cases during a dinner-debate held on December 14, organized jointly by the Forestry Association of the Saint Maurice Valley and the Alliance of the Chamber of Commerce of the Mauricie Region.

While one is concerned about the goodwill of the forestry industry's proper use of forestry resources and doubts the added value of this new energy source, the other insists that the principles of sustainable development will be respected and advocates for a model of employing a cocktail of renewable energies, including the use of forest biomass.

Several points of debate were at the heart of the discussions: forest conservation and the respect for allowable cuts, the total quantity of energy produced, and the creation of wealth and jobs, even the concept of carbon neutral activity was questioned.

It's clear that the debate is far from over, and only the future will tell how the bioenergy industry, that hope to carve out a place in the energy industry, will cope with the pressure from environmental groups like Greenpeace.

A black and white safety poster featuring two large, dark, textured boots in the background. Overlaid on the boots is the word "STAY SHARP" in large, bold, white capital letters. At the bottom left is the BC Forest Safety Council logo, which includes a stylized green and yellow triangle icon and the text "BC Forest Safety Council" and "Unsafe is Unacceptable". Below the main text, there is a smaller paragraph: "Slips, trips and falls are the second most common workplace injury. Stay on your feet with proper footwear, being aware of where you step and carrying only what is needed. It's easier to stay well than get well." At the bottom right is the website address "www.bcforsafet.org".



# Newfoundland

By Basil English , Forest Ecosystem Management Division, Department of Natural Resources

Thank goodness for digital cameras. Otherwise, what was I to believe when I received a call from Corey Wight, all the way up in the wilds of Labrador, when he told me that his black spruce seedlings were being eaten by grasshoppers just as quickly as they were being planted. Yes, that's right, grasshoppers! Or, to put it in biblical terms, "a plague of locusts".

Corey is the DNR Regional Silviculturist in Labrador. He was overseeing a contract planting job on the Churchill Road, just west of Happy Valley-Goose Bay. It was late August, 2011 and MC JR Contracting, a silviculture contractor from Lewisporte, Newfoundland was in the midst of a 106 ha planting job. They were using dibbles and pottiputkis to plant containerized black spruce grown at the local DNR tree nursery. The site being planted was an old burnover that had failed to regenerate naturally. Production was great (no slash, rock or significant vegetation) and quality was good. What could possibly go wrong at this point?

Enter *Melanoplus borealis borealis*, better known as the Northern grasshopper. Monitoring staff began noticing defoliation on Day 4 of the job. At times there were five and six grasshoppers per seedling, chewing away at the foliage and buds. At the time, the damage seemed to be limited and confined to small areas, so we allowed the contract to continue.



At the end of the summer, Corey's staff conducted a damage survey consisting of more than fifty 1/100 ha plots. What they found wasn't pretty. They determined that less than 10% of the planted seedlings had escaped defoliation. 32% of all seedlings planted had more than 50% of their foliage removed and 8% were totally defoliated. More than 70% had some or all of their buds removed. At this point we can only hope that the majority of seedlings survive the winter and begin to recover in 2012. A second survey will be carried out after bud burst next spring to see if we still have an intact plantation. Next year I'm predicting a rain of frogs.

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# BC First Nations Forestry Council

by Keith Atkinson

## Respect for the Land

When the Mountain Pine Beetle epidemic was identified by the land and resource managers of BC the ability for the forest sector to respond and mitigate impacts was a call to action that has played a significant role in the transformation of the forest sector in BC. First Nations leaders engaged with the province and the federal government to ensure their communities were contributing to mitigation efforts and together the forest sector embarked on comprehensive MPB Programs including the Forests For Tomorrow project.

In 2005 it was agreed that First Nations would be included in the mitigation efforts and the Mountain Pine Beetle Working Group, an initial organizing body, was transformed into the First Nations Forestry Council, a non-profit society put in place by the First Nations leaders of BC to support First Nations affected by the MPB epidemic. First Nations received resources and organized community-based priority setting.

The priorities identified five years ago remain the driving priorities today. Unfortunately, adequate resources to mitigate priority issues have limited full implementation of the strategies and as such leave communities at risk. The top priority, as you could imagine, is the fuel-management issue created by dead and dying pine trees around communities. The secondary priorities include economic revitalization through new concepts such as bio-energy as well as the need for ecosystem and cultural restoration of the devastated lands.

We continue to work towards making communities safe, however, the cost of implementing treatment prescriptions (clearing fuel from around buildings and communities) is uneconomic. Such significant cost items have no place in today's struggling economy and we continue to search for the magical bio-energy solution so we can remove all the fuel that surrounds communities.

The FNFC quickly became of relevance to all First Nations communities in BC as growing participation in interim accommodation agreements (treaty related agreements) that included forest tenure, clearly supported the need for a group like the FNFC.

## Forests for Tomorrow

The need for restoration after the MPB epidemic drew significant attention to the issue of planting or natural reforestation and the silviculture prescriptions related to salvage operations within the impacted areas. Initial commitments for silviculture efforts included the Forests For Tomorrow program where major projects were offered to qualified contractors. First Nations were included in this process through a loose arrangement that requested the contractors try and include First Nations.

The Forests For Tomorrow program has been re-classified, like many MFLNRO programs, due to the massive reduction in government budgets. FFT programming can now be found in the Land Based Investment Strategy. MPB funding from Ottawa disappeared and investments in reforestation has become low priority as economic uncertainty is the new epidemic of most concern.

## Timber Tenure Management

The New Relationship with the province has made available tenure opportunities for over 160 communities who currently hold harvesting rights in excess of 12 million cubic meters per year. This access is primarily short term 5 year non-replaceable forest licenses and includes a significant share of MPB uplift volume. The opportunity is staggering and unfortunately continues to be under-utilized.

Although this access to tenure seems like a good opportunity, the current forest sector economics and additional barriers unique to the aboriginal forestry sector are making this an extremely challenging venture.

## Employment

The Forest Sector like other resource sectors in Canada and BC is facing a labour shortfall over the coming decade.

The demographics of First Nations communities clearly show a tremendous opportunity for linking supply with demand. The challenges of incorporating aboriginal people and merging the work force of tomorrow are varied and very difficult to resolve. The failure to adequately engage with First Nations in the past FFT program highlights the challenge in silviculture. As well, the lack of partnership companies and progress in tenure management clearly shows the continued struggle to build co-management in the forest sector.

## Respect

First Nations values are based on caring and respect for the lands. Although economic challenges and cultural differences remain ongoing issues, as government-to-government discussions clarify title and rights, the First Nations Forestry Council is striving to build bridges in advancing First Nations participation in the sector and the ability to incorporate the many years of land based traditional knowledge into modern best practices for healthy forests.

# Society of American Foresters

By Steve Wilent

## **Clearcutting is Dead! Long live Clearcutting!**

When publisher Kate Menzies invited me to write an article about what interests Society of American Foresters members these days, I jumped at the chance. Having worked in the woods for most of three decades, I have much in common with readers of Silviculture Magazine. Besides, I'm half Canadian — my mother was born on a farm near Grimshaw, Alberta — so I feel right at home with this Canadian-born publication.

Judging by the articles in this magazine in the past few editions, we have many interests in common: restoring ecosystems, reforestation (or the lack of it), woody biomass, insect infestations, and so on. One topic of considerable controversy over the past few decades has been, and still is, clearcutting. I vividly recall the protests over one timber sale a decade ago on the Mount Hood National Forest, only a few miles from my home in Oregon. Treesitters occupied trees and protesters established tent villages near the sale. "Activists" blocked roads, locked themselves to gates, and scattered tire-puncturing devices on roads. Activists also burned three log trucks owned by the sale contractor. One treesitter fell to her death.

Yet this sale involved not extensive clearcutting, but moderate thinning of even-aged stands and creating openings

of a few acres as future habitat for deer and elk — far less intensive practices than the perfectly rectangular 20-acre clearcuts that stirred so many protests. That model of clearcut harvesting, for better or worse, gave all timber harvesting a bad reputation. To this day, that perception remains at the root of the continuing, though muted at present, conflicts over forest management, especially on federal lands in the US.

Enter professors Jerry Franklin and K. Norman Johnson. Franklin, a professor at the University of Washington's School of Forest Resources, and Johnson, a professor at Oregon State University's College of Forest Resources, are well known in the US in connection with the so-called Northwest Forest Plan, an effort to preserve habitat for the northern spotted owl, which was listed in 1990 under the US Endangered Species Act as a threatened species in Washington, Oregon, and California. The 1994 plan was designed to allow an estimated 1.1 billion board feet per year to be harvested from 24.5 million acres of federal land in the three states, far less than the allowable sale qualities of as much as 4.5 billion board feet annually in the region before the advent of the plan. Actual harvests since then have been a fraction of the 1.1 billion board feet target. Most of what is harvested is from thinning and "forest restoration" projects.

Nearly two decades after the advent of the plan, Franklin and Johnson say that the result of virtually ending clearcutting on these federal forests is a deficit of diverse early-successional habitat — and that regeneration harvesting is needed to restore it. In a presentation to SAF's Portland, Oregon, chapter late last year — entitled "Does Federal Forestry Have a Future in Western Oregon?" — Franklin and Johnson outlined a plan to create early-successional conditions in pilot projects in Southern Oregon. Instead of block clearcuts, they propose regeneration harvests on perhaps 60 to 70 percent of a given sale area, with the remainder in patches. All old-growth trees would be left in place. Instead of the usual intensive reforestation of the cleared areas, they'd rely on a combination of planting and natural regeneration and a minimum, if any, brush control. Conifers, they say, might not dominate the site for decades.

"One of the important justifications for the regeneration harvesting is to begin again to develop some early-successional ecosystems, because we're simply not creating those any longer," Franklin said. "That condition is disappearing on federal lands. On private lands, the reforestation is so aggressive that it essentially does not allow the development of those early-successional ecosystems, either — ecosystems that are highly diverse, both in terms of plants and animals, and have a lot of habitat specialists."

There isn't space here to adequately describe Franklin's and Johnson's plan or the pilot projects, but you can learn more at [www.blm.gov/or/resources/forests/](http://www.blm.gov/or/resources/forests/). If the pilot projects are successful — if they win the support of both environmentalists and the timber industry — this form of regeneration harvesting, if not quite clearcutting, could ensure that federal forestry does indeed have a future in the western US.

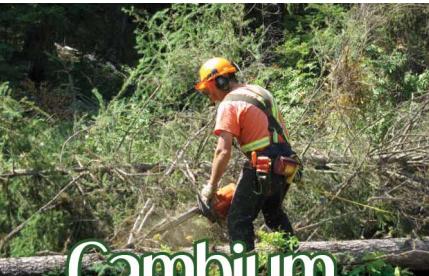
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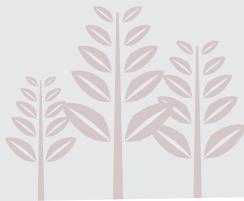


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# Reader's Lens



*Photo by Heather Mcansh*



*Photo by Simon Gregoire*



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# Will the Global Centre for Teak Production Shift to Latin America?

Words and photos by Raymond M. Keogh





Could it be that Latin America will eventually surpass Asia as the world teak producer? Can tropical American countries rival or even surpass Burma, India and Indonesia as sources of this lucrative species, in the way the British Far East colonies took over from Brazil as the producer of rubber? This happened after Henry Wickham smuggled 70,000 rubber tree seeds from the Amazon to Kew Botanic Gardens in the UK, after which they were sent to Asia in the final decades of the 19th century.

At first glance it may seem impossible. After all, the natural teak forests of Asia cover about 28 million ha in India, Burma, Thailand and Laos. In addition, over 90% of the 3 to 4 million ha of teak plantations worldwide are in Asia. However, all producers of natural forest teak, except Burma, have ceased exploitation. Besides, Burmese teak forests are shrinking, wood quality is declining and the yield is dropping, accelerated by illegal exportation across its northern border into China.

Asian teak plantations are also under stress. Local people are encroaching on Indonesian plantations and illegal timber poaching is also rampant. India's plantation growth is extremely low; theft in high-population areas is rife and competition for grazing land is relentless. In Africa many teak plantations are being mined rather than being managed properly. In Cote d'Ivoire, for example, teak areas are exploited beyond their annual allowable cut. In summary, we are seeing the consequence of the lack of sustainable management in the traditional

teak sector, including both natural forests and plantations.

An important factor to take into account, when considering future supply, is that a large portion of the Asian teak output is non-commercial. The total commercial harvest of teak, most of which currently comes from Asia, is about 3 million cubic metres. Therefore, if Latin America had 300,000 ha of commercial teak, growing on average, at 10 m<sup>3</sup>/ha/year, this would be sufficient to equal today's world supply.

The argument can be made that it is eminently possible for Latin American plantations to eventually dominate supply. The area of teak plantations in the region is increasing at around 10,000 ha per year and if that continues, by 2040, it will have the required base on which to produce 3 million cubic metres. Also, with about 100,000 hectares under cultivation now, it can also begin to be the source of large diameter teak well before this date. Besides, few teak growing areas around the world have the potential to expand plantations in a similar way to Latin America.

Some analysts are concerned about flooding the market with teak; but the wider high-grade tropical hardwood sector demand is projected to be 135 million cubic metres by 2050 and a large deficit is forecast. To meet the deficit an estimated area of 10 million ha of hardwood plantations will be needed. Teak has the potential to substitute for these hardwoods and contribute to decreasing the deficit. Unlike teak, few plantation species exhibit



its combination of resistance to fungi and termites; few have its durability, quality and strength.

In its home ecosystems in Asia, teak's familiar pests inhibit growth and quality while in Latin America it is relatively free, as rubber was, from its natural insects and pests. To meet the world's demand Latin American growers should develop genetic strains that are wind resistant and can be planted at wider spacing, eliminating loss to small, low value diameters in thinnings. Wide spacing would allow agroforestry intercropping and alternative earlier cash flows for improved economic returns, which will attract large-scale institutional investors. Compared to today's volatile

equity markets, teak's proven value growth is a hedge against recession. Of course social considerations should support the private and community co-development of plantations. Undertaken sustainably, the entire teak sector could function as a developmental mechanism in its own right.

In answer to the question posed above: indeed Latin America holds the potential to become the centre of supply for commercial teak during this millennium in the way that the Far East took over the production of rubber from Brazil last century. Latin Americans will be excused if they see this as an evening up for past disadvantages. ♦

OLAT (the Latin American Teak Organisation) was established in November 2010 to facilitate sectoral development and help investors and growers achieve these sustainability goals.

More information on this topic is provided in R. M. Keogh's UN online booklet, see:

[www.fao.org/docrep/012/k6549e/k6549e00.pdf](http://www.fao.org/docrep/012/k6549e/k6549e00.pdf)

Raymond M. Keogh is a teak specialist with over 35 years experience with the species in the tropics, during which he worked for community, donor, banking and private sectors. Raymond is the technical director of Tectona G Capital and a founding member of the Organización LatinoAmericana de la Teca (OLAT). He is active in promoting the development of the teak sector in line with the sentiments of this article.