

Silviculture

MAGAZINE

Summer 2013

Generating Revenues from Carbon Credit Sales

- Privately Managed Forest Land Owners Broke the Social Contract
- Community Forests in BC: Lessons from Abroad

INNOVATION SPOTLIGHT

Built with PROS in mind. STIHL's high performance clearing saws, the **FS 460 C-EMK** and **FS 560 C-EM** are built with uncompromising STIHL quality. You work in rugged conditions and so do these advanced tools. They are equipped with an easier starting logic, improved ergonomics, the 4-point anti-vibration system, toolless adjustable bike handle, STIHL's state-of-the-art M-Tronic™ electronic engine management system and STIHL's reputable Easy2Start™ system. After filling up with fuel and priming the fuel pump primer, all you have to do is set the choke and pull the starter handle. 3...2...1...Start! With a rugged professional design, these models have what it takes to help you in the field, whether you're maintaining a fence line or in the forest with a tough clearing job. **These clearing saws cut through the clutter and provide a hardworking solution for your heavy-duty jobs.**



SUPERB PERFORMANCE RIGHT FROM THE START



No matter if you're just starting work on the job or restarting the clearing saw after a break, M-Tronic™ adjusts ignition timing in all operating modes. It also precisely and electronically meters the fuel supply while the tool is in use. It even takes into account external conditions such as temperature, elevation and fuel quality. So you can

fully concentrate on the job and put peak performance to work immediately. The FS 460 C-EMK is lightweight for ease of use, produces fewer emissions and contains a superb air filter element for extended service life. The FS 560 C-EM definitely ranks high for superior performance. It is 12% more fuel-efficient than its predecessor, provides optimum engine power at all times and automatically adjusts to changes in elevation and temperature.

	FS 460 C-EMK	FS 560 C-EM
Displacement	45.6 cc	57.1 cc
Power Output	2.2 kW	2.8 kW
Fuel Capacity	0.75 l	0.99 l
Weight†	8.4 kg / 18.5 lb	10.2 kg / 22.5 lb
Sound Pressure Level	100 dB(A)	104 dB(A)
Easy2Start™	YES	YES

† Without fuel, cutting tool and guard.



**FS 460 C-EMK
Clearing Saw**

Innovation at work.

For over 87 years, STIHL has been a world-class innovator in outdoor power equipment. German engineered products featuring the latest pioneering technologies make STIHL the market leader. STIHL products are only available at independent STIHL Dealers who provide expert advice and on-site service. Thank you for supporting the leading team and for making STIHL the Number 1 Selling Brand in Canada.

www.stihl.ca



Find us on Facebook
STIHL Canada



Follow us on Twitter
@STIHLCanada



JOIN THE CLUB that
everyone is talking about!
www.STIHLCLUB.ca



* #1 Selling Brand in Canada is based on an independent market share analysis of imported gasoline powered handheld outdoor power equipment for the year 2012.

STIHL®



contents

features

- 6 Whoa, Neighbour: How privately managed forest land owners broke the social contract
- 10 Community Forests in BC: Lessons from Abroad
- 18 Generating Revenues from Carbon Credit Sales: It's All About the Inventory
- 20 Mountain Pine Beetle: A Nation Involved

columns

- 4 Notes from the Field
- 9 Focus on Safety
- 13 Forest Health
- 14 Western Report
- 15 Saskatchewan Report
- 16 Ontario Report
- 17 Readers' Lens



Publisher Kate Menzies
Designer Krysta Furioso
Editor Dirk Brinkman

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

Notes from the Field

By Dawn Brinkman



MSF team enjoy Christmas Dinner together at the Bon Marché Hospital in Bunia

and epidemics. The base has 140 full time national staff and a revolving door of 25-40 expats from around the world. My role as the Log Base (the charming abbreviation of logistician) of Bunia was basically everything involved in running the Base. To break it down, my logistical team was 42 guards, 11 drivers, 5 radio operators, 4 water sanitation techs, 2 mechanics, 2 electricians, 1 carpenter, 2 supply managers and an assistant. The Logs' responsibility is to manage the logistical team and all the systems that keep operations running. The working environment is fast paced, stressful and involves dozens of "vibrant" (and often conflicting) personalities from across the world; it was an amazing challenge. To say I was great at the job right off the bat would be a stretch of the imagination, but I felt time and again that I had an advantage given my experience supervising tree planting camps. It turns out being a Log draws a surprising number of parallels with the lifestyle and management skills learned in the planting world.

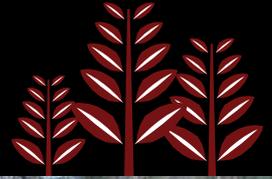
So, what do you learn from planting? Well, some truly "unique" stuff- like how to pull/dig/curse a stuck truck out of a soft shoulder or how to strategically duct tape scabby fingers and open wounds, or nurse a bag rash, among a wealth of other dirt-bag tricks that could be considered only relevant to the industry. But what is rarely acknowledged is the soft skills you gain working in this often undervalued, and over-dramatized sub culture. Planters live and work in a tight community, cooperatively and efficiently. We are responsible for one another, day after day, we forge bonds and become adept at resolving interpersonal conflicts and tensions. We work in remote and harsh environments that challenge us both mentally and physically and we become incredibly resourceful and adaptable to ever changing conditions, unforeseen problems and even crisis.

When managing a planting camp, you live and breathe this job. You need to find a way to make it work right then and there. You live, eat, work and party with your crew. There's no going home at 5pm to decompress and disconnect. As a manager, the pressure is on. You have a mind map of every truck and planter and block and tree and how they all fit together in organized chaos. Your decision making has to be confident, quick and must maintain balance between conflicting interests and priorities. This less tangible yet critical attribute of supervising became an apparent advantage during the ongoing security incidents in Bunia, when I was responsible for retrieving staff and expats from town during conflict. The ability to work through the conflicting needs and complex logistics of these situations, while tracking movements and communicating with the individuals, felt like exercising a familiar muscle in a different world.

I am but one of many planter-turned-MSF-ers who have reflected on the planting experience and recognized how well skills

No planter can deny sharing in our collective "what good is this job?" cynicism. We've all taken pleasure in the rants and criticisms, minimizing our status to ditch digging labourers. And let's face it, some aspects can leave you broken and bound to the quick-money, seasonal lifestyle. But after this last winter, I have a new appreciation for the hard and soft skills I've earned from my time in the bush.

After over a dozen years planting trees across BC and Alberta, the last of which were spent running planting camps as a supervisor, I had the opportunity to explore this undervalued and varied skill-set in an unusual, yet paralleled, context. For 5 months this past winter, I worked as a logistician with Médecins Sans Frontières (MSF), otherwise known as Doctors Without Borders, in a town called Bunia, the capital of the North Eastern Province Oriental of the Democratic Republic of Congo. Bunia hosts MSF Swiss' largest coordination base, which supports a number field projects and hospitals, established in response to conflicts, malnutrition



translate between these professions. One of MSFs Holland's most senior logisticians and Heads of Mission, Ivan Gayton, transitioned from tree planting supervision to logistics about 10 years ago. Ivan wrote an article titled 'The mysterious Nexus of tree planting and Humanitarian logistics' which covers the sheer technical similarities such as remote camp logistics-generators, tents, water supply and sanitation, radio communication, cold chain (whether it be vaccines or trees), electricity, transport, risk management and security. In addition to the clear parallels of the technical and managerial skills in the logistics department, Ivan points out that MSF recruiters have long since identified Canadian tree planters to have higher success rates on Mission. What does this mean? A doctor, nurse, administrator or logistician with a planting background has a lower chance of dropping out than any other professional demographic from which they hire. This correlation speaks

directly to the strength of character with respect to the cooperation, community, and endurance needed to thrive in a planting camp and in turn a field mission.

So planters- give yourself some credit for being able to push yourself both physically and mentally, and for the ability to cooperatively and supportively work and live in an intricate hive of personalities. To step outside your comfort zone into uncertain and remote conditions without the luxuries and comforts of home for months on end. Not everyone can cut it. And the same goes for crewbosses, tree runners and supervisors, for navigating the logistics and responsibility of running crews. This hard knock school of management has no doubt left you with a set of hard and soft skills applicable to many interesting and dynamic jobs out there – humanitarian logistics to name just one.

Dawn Brinkman has been planting trees or supervising in BC and Alberta for 13 years. She writes this from camp in 100 Mile BC where she is supervising a contract for Brinkman and Associates. Dawn can be reached at dawn_brinkman@brinkman.ca

Established in 1971, Médecins Sans Frontières (MSF) is one of the world's leading independent international medical relief organizations, working in around 80 countries worldwide and with operational centres and national offices in 19 countries. For more information, check out their website at www.msf.ca.

S100A Refresher

Available online at
www.s100a.com



Group rates at
10%
Discount

WHIMIS Training now offered online

Contact Jake Jacobson, Instructor
Wildwood Resources Ltd.
250-832-2300 | info@s100a.com

Whoa, Neighbour: How privately managed forest land owners broke the social contract

By Carrie Saxifrage

In a universe parallel to the one Rod Bealing describes in “Public Attention for Private Forests” (Silviculture Magazine, Spring 2013), the communities adjacent to lands regulated by the Private Managed Forest Land Act aren’t hearing “Howdy, neighbour.” They’re hearing, “Please look the other way while we rip the heart out of your tourism industry, ruin your drinking watershed, close down opportunities for permanent forest jobs, deliver the final blow to declining fish runs, convert forest land into real estate developments and intensify the impacts that climate change will have on your lives. We’re allowed. It’s private land.”

Public money creates a public duty

Since 1947 the province of BC has subsidized ‘managed’ forest land with lower property tax assessments. On Cortes Island, for example, I paid about \$62 in taxes in 2011 for each of my 20 inland acres. Island Timberlands (IT) paid between \$5 and \$6 for its inland acres a few kilometres away. On a land base of 1,800 Ha over a period of twenty years, this results in a comparative \$4.7 million property tax savings for IT. Even with the lower per acre value of large parcels, this is a multimillion dollar tax break. What is the public getting for these tax breaks? In Regional Districts such as the Cowichan Valley, the timber companies’ lack of direct contribution to community coffers, or indirect contribution through permanent sustainable forestry or value added manufacturing jobs, has become a political issue.

The history of private managed forest lands is one of public largesse. The Big Three timber companies (TimberWest, Island

Timberlands and Western Forest Products) hold land that first became private in exchange for a public service: building a railway. The original social contract for Tree Farm Licenses (the logging rights to public lands) was to return that land to management under Crown regulation. But the timber companies very profitably broke that social contract- and the provincial government let them – when they released their private lands from TFLs.

The PMFLA

Doug Harris of the UBC Faculty of Law has described the PMFLA as “a highly flexible, industry-friendly Act, which does not prohibit activity on forestland, but provides incentives to forestland owners who comply with its provisions.” Regarding values such as drinking water, soil, fisheries and critical habitat, the PMFLA has vague “management objectives” with no specific requirements. It’s a perfect piece of legislation in that way: it contains the key words that allow timber companies and their allies to claim that important public goods are “regulated”, while the Act remains empty of meaningful obligations. In fact, it explicitly excludes the need to consider cumulative effects from activities on adjacent lands. Nor is the PMFLA reasonably enforced. In the past 11 years, the PMFLC has imposed remediation and a fine in only one instance.

The results of a “results based” regulatory regime

According to the Canadian Centre for Policy Alternatives, the results of the PFLMA include: logging at twice the sustainable rate; ever younger trees

logged; all of Island Timberland’s Douglas fir “merchantable” stock slated for depletion in 25 years; loss of jobs because trees are no longer delivered to coastal mills; a huge increase in raw log exports from B.C.’s coast, 62 per cent of which come from private forestlands; and tens of thousands of hectares of private forestland being readied for sale as real estate developments or other “higher and better uses.”

The new B.C. economy: Tourism

According to NDP MLA Bill Routley, under the BC Liberals, 35,000 forest jobs were lost and 17 manufacturing plants closed on Vancouver Island alone. Six million cubic metres of raw logs were exported in 2012. The sight of a single employee operating a feller buncher far up a deserted road could make any B.C. citizen weep – or, for that matter, watching the five or so container ships that leave Vancouver Island each month, full of raw logs.

The Liberals may have given the timber companies what they want, but the result is that communities have little or no stake in timber company operations. Instead, they depend on the hinterlands as a playground that attracts tourists from western B.C.’s burgeoning cities and, indeed, the world. Tourism, not timber has become the forests’ biggest contribution to local economies.

In the Discovery Islands, tourism operators have joined forces to make their case to the province. According to their group:

- In 2008, B.C.’s tourism revenue exceeded its forestry revenues;
- For example, the Discovery Islands/



Bute Inlet area is no longer dependent on the forest sector - less than 11% of the regional GDP comes from logging, while at least 60 tourism operations employ over 650 people.

- Tourists come to the area to watch the southern grizzly bear populations; to play on the well known tidal rapids; enjoy the rich marine life including whales and fishing; and explore the 16 B.C. Marine Parks in addition to the land based B.C. Parks and Regional Parks.

Vancouver Island touts itself as an eco-tourism destination and people spend money to see wilderness, not clear cuts. It's not only citizens that protest logging now. Towns like Port Alberni and businesses like the Discovery Islands tourism operators do as well.

Drinking water

The PMFLA provides virtually no protection to drinking watersheds and the PMFLC provides virtually no enforcement. Vancouver Island has suffered extensive watershed destabilization and degradation with severe impacts on both drinking water supplies and fish habitat. Timber companies have stripped uplands of forest cover and rapid spring runoff creates flood damage followed by accentuated summer drought. Montane uplands have poor regeneration and the hydrological effects are long lasting.

Shawnigan Lake residents, who take their drinking water from the lake, have spent a decade fighting to protect it from the cumulative effects of logging, much of it on private lands owned by Island Timberlands

and TimberWest. According to one citizen, about 80% of the second growth on private lands has been logged over the last twenty years resulting in a loss of capacity for the surrounding forest to filter the water going into Shawnigan Lake.

One incident that reveals how well foxes guard henhouses occurred when the PMFLC failed to pursue a known violation until a citizen group sought enforcement. PMFLC found fault, rescinded the fine, and did not pursue any other responsible party.

Fish habitat

Bealing's assertion in the previous Silviculture Article that independent audits show that the fish habitat "value" has been protected to the same degree on private land as on public land suggests only that both are severely degraded. Impaired freshwater fish habitat, combined with increased ocean mortality from climate change, continues to drive the severe decline in fish stocks.

The Greater Georgia Basin Steelhead Recovery Plan website shows that nearly all the steelhead populations of Vancouver Island are of "extreme conservation concern," and private land logging is listed as the major culprit in a substantial number of streams.

Forest land into real estate developments

Timber companies can now cash out their various de facto public subsidies by selling lands for residential development, a so called "higher and better use" that is vastly more profitable to shareholders in the short term. These low elevation lands converted to development have some of



Cortes forests owned by Island Timberlands include the island's central groundwater recharge area and make Cortes a desirable tourism destination. Beyond such "ecosystem services," many island residents simply feel responsible for the continuing survival of the forests and the threatened species that are their wild neighbours: red legged frogs, blue grouse and northern goshawks, among others.

the best conditions for growing trees.

According to the CCPA, in 2007 TimberWest designated close to 17% of their 322,000 hectares as better suited for other uses. Island Timberlands' parent company, Brookfield Infrastructure Partners, told shareholders that about 5% of IT's 256,136 hectares are suitable for higher and better uses.

Timber companies pay no exit fee to compensate for their incredibly low property taxes if the land has been in the managed forest land class for more than 15 years. Remember how Island Timberlands pays something close to 10% of what I pay in taxes? It can turn around and sell its land at premium development prices without the province recouping any of the hundreds of millions of dollars in foregone tax revenue.



These photos show the the private managed forest land base between Campbell River and Comox in 1984 and 2012. This level of logging is representative of all the E&N railway grant lands of SE Vancouver Island. For more comparisons by year, go to world.time.com/timelapse/ For a map of PMFLA lands, go to www.pmfrc.ca/maps/vi.pdf

“Independent” certification

As long as the timber companies can pretend that Sustainable Forestry Initiative (SFI) certification responds to community or ecological values, they will remain in their alternate universe. Recently Forest Ethics pointed out that SFI is an industry-conceived scheme that protects industrial forestry, not forests. In particular, SFI does not require the longer rotations and less intensive methods that would provide quality wood to sustain value added manufacturing that would lock up carbon in durable heartwood, and replenish the habitat that is currently being diminished.

The bubble has popped

Brookfield Infrastructure Partners (BIP) is negotiating to sell its 25% share of Island Timberlands for \$170 million, a deal expected to close in 2013. BIP found IT couldn't meet its target of a 12-15% return on equity. The target was based on an unrealistic expectation: that

communities will acquiesce to industrial logging followed by rezoning for residential use. They will not.

Communities are banding together for strength, such as the citizens of Roberts Creek, the Sunshine Coast, Qualicum Beach, Cortes Island and Port Alberni who demand that Island Timberlands incorporate community aspirations into their operations. Markets campaigns are going forward, to help consumers link forest products to socially inoperable lands. Pensioners are awakening to the fact that their pension funds (e.g. PSP and bcIMC) own the companies that are decimating Vancouver Island's forests and they are demanding reform.

Whoa, neighbour!

If the author of “Public attention to private forests” really wants to know why so many British Columbians are so angry with private forestry, he might consider how patronizingly phony his “Howdy, neighbour!” sounds to actual neighbours. The Big Three export raw logs (and jobs), use machine-intensive logging practices and remove their land from TFLs so they can “log and flog” it. These practices hurt tourism jobs, future forest economies, drinking watersheds, fish habitat and ecosystems. They also destroy the resilience we will need as climate change intensifies the flood/drought cycle that many communities already face.

Timber companies have sought and received public largesse. In exchange, they have a public responsibility to conduct truly sustainable logging that maintains forests as healthy ecosystems and supports tourism jobs, long term forest employment, fish habitat, drinking water supplies and the integrity of community landscapes. British Columbians are justifiably angry that private forestry so flagrantly and consistently breaches its social contract. Demanding rights but refusing responsibilities goes by many names. “Neighbourly” certainly isn't one of them. †

Carrie Saxifrage owns land on Cortes Island where she has advocated for ecosystem based forestry on private and Crown forest lands for nearly two decades. She reports on sustainability issues for thevancouverobserver.com.

Cambium
Contracting and Quality Saw Training in BC and AB

- QST3Faller Evaluations
- Enform Level 1 Chainsaw Basics course
- Enform Level 2 Faller Entry Course
- Chainsaw safety training

Contact John Courchesne at 250 819-8733
 bbradiankidd@yahoo.ca | Lillooet, BC

Climate Change

Bealing's article ignores how industrial logging intensifies the serious risks to water and food security imposed by climate change. First, it's a major contributor: logging in BC releases more carbon emissions than the tailpipes of BC's cars. Second, it increases spring flooding and summer drought. Climate models predict that Vancouver Island will have more water shortages. Warmer, wetter winters will reduce snowpack. Cool, wet springs will increase spring floods. Warmer, drier summers will mean regular droughts with drinking water and agricultural water shortages. Timber companies don't account for these profound changes and they put community water supplies at risk.

Focus on Safety



By Gerard Messier, BC Forest Safety Council

A New Safety Certification System for the Forest Industry

Are you aware that the forest industry is working on a program that will reduce costs, create efficient operations and reduce paperwork? With the help of the BC Forest Safety Council, industry is renewing the prequalification system that is better known as SAFE Companies certification.

What is a prequalification system anyway? In this case, it is a process to check if a company has the necessary procedures and processes in place to be a safe, high quality and reliable organization.

Two industry committees have been formed to overhaul the certification. The first is the Steering Committee that is made up of senior representatives from industry organizations, licensees and unions. This committee was formed to provide high level guidance of the process. The Working Committee is the second group and they are doing the heavy lifting to complete the actual redesign of the system. This committee is made up of representatives from contracting companies and licensees who have plenty of experience and new ideas.

This renewal of the system has three goals:

- **Developing an injury reduction and business management system**

Pre-planning, good communications, and healthy, productive employees are all hallmarks of a profitable business. Safety and business management are not two separate things; in order for a company to reach their full potential, the two must be integrated into day to day operations.

- **Creation of an efficient and effective tool for auditing this system**

A system that focuses on managing risks “in the field” instead of managing paper will be the most effective in reducing injuries. A focus on the leadership, competency and culture of the operation is needed during these checks.

- **System is owned by industry**

The forest industry will create and own this process and will be supported by the BC Forest Safety Council with the necessary tools and training. Communication is key during the development of the system, so be on the lookout for further updates or contact the BC Forest Safety Council at 1-877-741-1060 for further information.

In order for a meaningful renewal of the system, it is necessary to start from scratch. The committees are focused on these three goals, and are keeping open minds to find new and practical ways of building the type of system that will successfully reduce injuries and improve business operations.

Want to get involved? The committees will be releasing a discussion paper this fall about the new prequalification system; get a copy from your industry association or from the Council and send in your feedback.



Photo by Terry Chow



Photo by Steve Telosky

Steering Committee Members

- Kerry Douglas - West Fraser Timber
- Otto Schulte – Interfor
- MaryAnne Arcand – Central Interior Logging Association
- Dwight Yochim – Truck Loggers Association
- John Bulcock - Western Forest Products
- Tom Jackson – Ministry of Forests, Lands and Natural Resource Operations
- Ron Corbeil - USWA-IWA
- Dave Whiteley - TimberWest

Working Committee Members

- Randy England – West Fraser Timber
- Doug Harrison – Interfor
- Ed Ma – Tolko
- Glen Williamson – Hytest Timber Ltd.
- Jeff Holland – KDL Group
- Angelika Posselt – Tahtsa Timber
- Don Banasky - Copcan

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

Community Forests in BC: Lessons from Abroad

by Reem Hajjar, M. Fernanda Tomaselli and Robert Kozak



A community-owned sawmill in Quintana Roo, Mexico
Photo by Reem Hajjar

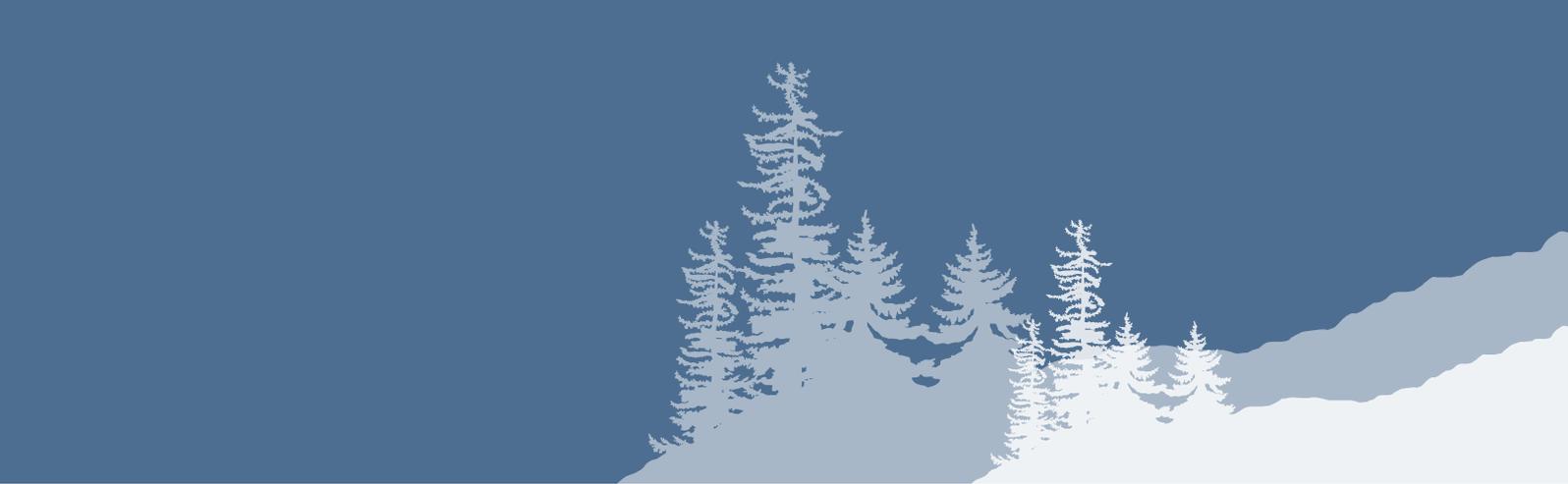
Since their formal inception as a result of amendments to the Forest Act of 1998, community forests in British Columbia have had a checkered history. That said, successes have far outweighed failures, and there is widespread agreement that the community forest tenures are an appropriate path forward for BC's forest sector. However, some problems remain, and currently, community forests in BC are grappling with four pressing needs¹: (1) the expansion of the community forests program to allow for any community with forestlands surrounding it to initiate one; (2) increased government funds to support marketing activities; (3) the reinstatement the Land Based Investment program or similar funds that would allow for improved forest management; and (4) clarity on community forest governance issues and how volunteer boards and hired staff can best work together for the benefit of local communities.

Researchers at the Forests and Communities in Transition (FACT) Lab at UBC have spent a good deal of energy in recent years studying the community forest experiment around the world. Our feeling is that there are valuable lessons that BC could glean from the experiences and growing pains of community forests in other

countries. In fact, there are myriad examples of community forestry initiatives world-wide that one can draw lessons from. Here, we focus on two regions, Mexico and The Gambia. Having developed formal community forest enterprises in the 1970s and 1980s through both community- and government-driven processes, Mexico is seen by many as a global leader in community forestry initiatives. Meanwhile, The Gambia's more recent history of community forestry – since the 1990s – provides the perspective of a deliberate move on the part of the government to improve forest practices by decentralizing management to communities.

One of the most notable characteristics in both regions is the incredible diversity of activities that take place within their community forests. In The Gambia, for instance, diversity is reflected in the multiple subsistence and commercial goods and services derived from the forests – firewood, ecotourism, honey and furniture to name a few examples. Similarly, in Mexico, community forests along the Sierra Norte and Sierra Sur of Oaxaca support a variety of forest-based enterprises. Some of the communities not only own fully integrated timber enterprises processing lumber and furniture, but they also run ecotourism businesses, sell handicrafts, process pine resin and operate water-bottling plants within their watersheds.

Diversity is seen in business ownership structures, as well. In The Gambia, both community-controlled and individually-owned businesses can operate within the confines of their community forests. The existence of community-owned businesses has led to high degrees of much needed social investment by funding vital projects that increased villagers' access to water, electricity and transportation. For example, the community-owned firewood businesses in one community have invested in water pumps, solar panels and even purchased a mini-bus for facilitating local travel². In addition, profits were used to pay for community taxes, finance school activities and fund community celebrations. Individually-owned forest businesses, on the other hand, tend to focus more on the short-term needs of particular households – the provision of food, health, education and so on. In either case, the advantages that forest-based enterprises have generated for the rural communities where they occur cannot be overstated, as even the most basic services were lacking prior to the implementation of community forests. In Mexico, this diversity of business models has led to a situation where profits from more income-generating community enterprises are floated to less profitable ones as a means of



keeping all of the enterprises afloat and retaining high rates of employment within the communities. In both regions, the success of these forest-based businesses has also had substantial indirect socioeconomic benefits. For instance, in one village in The Gambia, the local ecotourism enterprise is the main customer of other local businesses like the community bakery and the women's vegetable garden, meaning that its existence has led to further employment and wealth being generated within the community.

This diversity within community forests is not without its problems. Specifically, it leads to complexities with respect to governance structures. Globally, these structures range from national regulations and policies that balance government involvement in community decision-making (or allow for community involvement in government decision-making) to internal governance structures that dictate how forest management is organized, what access, management and monitoring rules will be applied among community members, how conflicts will be resolved and how benefits should be shared from the use of a communal resource.

Since Mexico is often seen as a leader in community forestry worldwide, its governance model has been replicated in other countries, but not always with the best results³. In Mexico, forest management structures were initially built upon existing collective land management structures that were shared by all ejidos (communal land holdings). With time and changes to legislation, these were allowed to evolve into management structures that were better suited to individual communities, where needed. Perhaps the best lessons to draw here is that, while governance structures around the world tend to vary depending on context, the more successful cases usually build on existing structures and are given the space to slowly evolve while adapting to new conditions.

One could argue that this entrenched communal tenure system has greatly simplified and advanced the adoption of community forestry in Mexico. Broad agrarian reform that devolved land ownership to communities throughout the 20th century, later coupled with communal, local forest ownership and a gradual decentralization of management authority over those forests, formed the basic building blocks of a community forest sector. With local ownership of the land and resource clarified early on, Mexican communities had already overcome a struggle still shared by many forest-dependent communities around the world. But this devolution alone would not have been sufficient for the expansion of the Mexican

community forestry sector. In the last two decades, national and state governments, often with international donor support, have provided much needed support to community forest enterprises, largely in the forms of training programs and loans that encouraged diversification of forest enterprises. Inter-community associations and regional alliances have provided communities with technical services, assisted in marketing products at scale and represented community interests in policy-making at both state and national levels. The many examples of successful community forests in Mexico did not emerge by working in isolation.

Similarly, a key actor in the success of community forests has been the government of The Gambia – through its Department of Forestry – by providing support for the business development of community forest enterprises. This support has been in the form of capacity building, primarily in areas related to forest management, business planning and record keeping. In addition, some enterprises have received technical training in a diverse range of topics, like furniture design and honey production. In fact, the role of capacity building has been so crucial in the conception and expansion of community forestry in The Gambia that it has been included as a fundamental aspect in official government policy. Notably, government backing has not been limited to skills training, but also includes ongoing economic support of varying kinds. Some enterprises have received microloans for establishing or expanding their businesses, while others have been granted materials for starting-up their operations. As in Mexico, associations of producers in The Gambia have been vital in complementing the role of the government and supporting forest-based enterprises. They have, for example, provided training and business assistance to many of their members, in addition to providing much needed loans and material supplies.

There are many opportunities for BC to learn from the successes and failures that have occurred in community forests in other parts of the world. While the development of community forestry globally has not come without its share of problems, the cases presented in this article show that community forests in Mexico and The Gambia have generated an ample variety of benefits that go beyond traditional measures of business success. Increased resilience through diversification, high social investment, improved forest conservation, the generation of local employment, innovation and entrepreneurship, are only some of the advantages identified by our research.



Vehicle for villager's transportation, purchased with the profits from a community-owned forest-based enterprise in the Western Region of The Gambia
Photo by Fernanda Tomaselli

The establishment and progress of the cases reported here are the result of support provided by their respective governments – especially in the areas of tenure reform, capacity building and financial assistance – to create enabling environments for community forest initiatives to flourish. This support has been largely complemented by the efforts of various associations (of communities and enterprises), which have demonstrated that collective action largely outpaces the benefits of working in isolation. Our cases indicate that, if community forestry in BC is to expand and scale up, these actors will likely be key to achieving success. †

Rob Kozak (rob.kozak@ubc.ca) is a Professor at the UBC Faculty of Forestry and the Head of the Department of Wood Science. He directs the Forests and Communities in Transition (FACT) Lab, which focuses on the wellbeing of forest-dependent communities, international development and poverty alleviation strategies, forest sector sustainability and competitiveness, and alternative tenure and business models for the forest sector. Reem Hajjar (reem.hajjar@gmail.com) is a Postdoctoral Fellow in the FACT Lab whose research focuses on community and smallholder forestry, REDD+, and forest certification. Fernanda Tomaselli (fertomaselli@hotmail.com) is a PhD Student in the FACT Lab

with interests in ecological economics and sustainable degrowth, whose past work focused on community forest initiatives in The Gambia.

¹ Personal communication, Susan Mulkey, Manager Extension and Communication, British Columbia Community Forest Association, May 2013.

² See Tomaselli, M.F. 2011. Limitations and opportunities for small and medium forest enterprises in The Gambia: An exploration of the Business Environment, Business Development Services and Financial Services. MSc. Thesis, The University of British Columbia.

² See Hajjar et al. 2013. Community forests for forest communities: integrating community-defined goals and practices in the design of forestry initiatives. Land Use Policy. 34: 158-167.

STAY SHARP



BC Forest Safety Council
Unsafe is Unacceptable

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. www.bcforestsafec.org

Forest Health



By Lisa Derickx, Invasive Species Research Institute, Algoma University

Managing Exotic Invasive Species in Ontario's Hardwood Forests: How landowners and woodlot managers can protect their forest ecosystems

Exotic invasive species (EIS) are plants, insects or pathogens that, either intentionally or not, have been introduced to a new habitat where they have the ability to cause harm to the environment, the economy and/or society. A variety of EIS are detrimental to the hardwood forests of Ontario. For example, invasive plants can alter forest integrity through rapid population expansion. They can out-compete many native species and cause shifts in species abundances, thereby altering the forest ecosystem. Invasive insects and pathogens can severely damage hardwood trees, reducing timber value and potentially causing large-scale hardwood mortality.

There are several strategies, techniques and control options to be aware of when dealing with EIS. Prevention is the most efficient and cost effective approach to management. Creating a prevention plan and keeping a diverse and healthy forest can reduce the risk of invasion. When planning any type of forest management woodlot owners should include a plan to prevent the spread or introduction of EIS. For example, soil disturbance will make an area prone to invasion, especially if there are invasive plants in the vicinity. As a mitigation strategy, plant native species in areas where soil disturbance is unavoidable and monitor the area frequently to ensure that invasive plants do not establish. It is important to keep all equipment such as tractors, skidders and all-terrain vehicles free of mud and debris that can harbour seeds and plant fragments. Clean and inspect equipment in a designated area that can be monitored for suspect invaders. Invasive insects and diseases caused by pathogens can also be prevented through keeping up-to-date with quarantines that restrict the movement of firewood and other wood related products. Keep trees healthy and prevent bark damage as wounds can increase susceptibility to pathogen infection and weaken resistance to insect attack.

Early detection and rapid response is the next best thing to prevention. Having the ability to detect newly established EIS at the initial stage of invasion is important. Invasive species are much easier and cheaper to control in these early stages and being able to respond rapidly after a new invasion is detected will minimize the overall damage to the woodlot. Learn how to properly identify EIS that are prominent in the area and become familiar with the species in your woodlot. Although managers may already have an inventory of tree species as part of their woodlot management plan, it is a good idea to also include understory species. Afterwards, if any new EIS appear they will be readily detected, decreasing the likelihood of new invasions. Visual surveys and monitoring activities are important in the detection of invasive insects and pathogens. Look for multiple signs of invasion to help properly identify the causative agent.

Effective invasive species management requires an understanding of the biology of the trees and other living things in the hardwood forest, including the EIS. Management options should take into consideration the environmental and social context. Management and control options for EIS that affect hardwood stands should be based on maintaining a healthy forest. This requires planning, commitment, effort and money. Forest managers and woodlot owners should choose methods that are well aligned with their objectives and goals for the present and future use of the woodlot.

Physical control is the manual removal or destruction of the invasive species. Depending on the species to be controlled, hand-pulling, digging out roots, removing flower heads, or mulching may be effective.

Biological control involves releasing living organisms that feed upon, parasitize or infect the unwanted species. These programs are coordinated nationally or regionally and are beyond the ability of



Hand-pulling garlic mustard (*Alliaria petiolata*) in the forest understory

individual landowners, but the results of successful programs are cost-effective and long lasting.

Chemical control with pesticides can be part of an effective control program. Pesticides are most effective when they focus on vulnerable life stages, and when they weaken or kill the EIS, and give a selective competitive advantage to desired species. Many pesticides require a licensed exterminator to be applied. Refer to the Pest Management Regulatory Agency, or provincial environment or natural resource ministries for more information on pesticide use.

The Invasive Species Research Institute published "A guide to the identification and control of invasive species in Ontario's hardwood forests" last year, funded in part by the Invasive Species Centre (ISC). This richly illustrated guide is packed with information about 25 species invading Ontario's forests, and includes information about identification, look-alikes, effects and control strategies. You can view this guide online at www.isri.ca/current-projects/invasive-species-guidebook.html, or buy a copy at Amazon.com www.amazon.com/dp/0929100212.

Lisa M. Derickx, B.Sc., is a Research Associate at the Invasive Species Research Institute (ISRI) in Sault Ste. Marie, Ontario. She has a B.Sc. Honours Degree in Environmental Science from Carleton University and a diploma in Fish and Wildlife Conservation from Sault College of Applied Arts and Technology. As primary author, she recently published "A Guide to the Identification and Control of Exotic Invasive Species in Ontario's Hardwood Forests". Email: lisa.derickx@algonau.ca



Western Report

By Lloyd Helferty

The Alberta Biochar Initiative “Launch” Event

On May 23, 2013 I attended the Alberta Biochar Initiative (ABI) Ribbon Cutting and Biochar Seminar at Alberta Innovates-Technology Futures (AITF) in Vegreville, Alberta.

This event was a celebration of the establishment of the ABI in order to “expand opportunities for biochar deployment in Alberta’s developing bioeconomy”, and a follow-up on the previous stakeholders workshop that was led by AITF in October 2011.

A highlight was having ABI showcase their two mobile “demonstration scale” biochar units (photographed). The event attracted over ninety participants and featured many incredible speakers, including Dr. Julie Major, a member of the recently inaugurated Canadian Biochar Consortium. Dr. Major is one of the foremost Biochar experts in North America, and gave the keynote presentation during the event. The seminar also included presentations by experts and industrial proponents of biochar and a panel discussion that included representatives from major industries, universities, colleges and policy experts exploring the fast changing terrain of biochar development in Alberta and around the world.

Interestingly, even though this event was held in Alberta, and there were representatives from big industry, including a great presentation from the Technical Director of the Alberta Newsprint Company, much of the focus continued to be on local, small scale Biochar. The emphasis was on considering how biochar ventures could be beneficial to communities across Canada, many of whom are considering making investments in technologies that would increase local bioenergy production and enhance food security.

One gentleman I talked to from a small Custom Sawmill who had come to the event from British Columbia was intrigued by the variety of uses for biochar, and likely walked away from the event with a much greater awareness of how he might utilize his sawmill residuals to create a

number of ‘value added’ products and help improve the income from his operations.

The event successfully attracted many locals – including the Mayor of the Town of Vegreville – along with researchers from the University of Alberta, University of Calgary, Langara College and Olds College as well as the Branch Head of Alberta Agriculture and Rural Development, FP Innovations and Alberta Environment, as well as some national and international participants, including Commissioner of the Netherlands Trade office and the Managing Director of Black is Green Pty. Ltd., also known as “BIG Char”, who came all the way from Australia. The BIG Char system is one of the two technologies that were selected by Alberta Innovates Technology Futures to undertake their preliminary investigations of biochar in Alberta – the other being a fully automated system built by Abri Tech Inc. of Quebec. Both systems are “portable” and mounted on a trailer that can be moved around from site to site (feedstock to feedstock).

The presence of the local Aquaponics Society was indicative of the diverse audience that was attracted by the topic of biochar. The multiple synergistic uses of biochar in food production industries, on farms and in forests tends to cut across disciplines much more than many other technologies that might be considered “bioenergy”. But of course, pyrolysis and biochar should more appropriately be considered “environmental technology” that can produce multiple benefits; energy, improved soil properties (fertility) and carbon sequestration for mitigation of climate change.

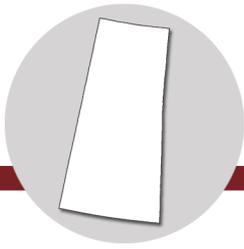
Natural Resources Canada’s Canadian Wood Fibre Centre (CWFC), which is part of the Canadian Forest Service (CFS) were also in attendance along with two CFS representatives and the CEO and Director of Forest Technology at Alberta Innovates Bio Solutions (AIBS) as well as the past President of the Woodlot Association of Alberta. The forest sector is a major



stakeholder in biochar development from the perspective of fibre management, and bioremediation.

Overall it was an excellent event and should help to advance efforts for appropriate utilization of forest residuals for biochar production and create opportunity and benefits for the forest sector overall. As Richard Wayken the AITF General Manager or Bio & Industrial Technologies said prior to the event, “Alberta’s rural-based, small- and medium-sized companies will be able to deploy this green, clean technology to unleash the value in agricultural and forest residues which were once considered waste, and make the most of Alberta’s fibre resources.”

Lloyd is an engineering technologist with more than 10 years experience providing project & system support for engineering projects and activities related RD&D. He is a subject matter expert in Biochar & founding member of the Canadian Biochar Initiative, President of Biochar Ontario, an Advisory Committee Member of the International Biochar Initiative (IBI) and runs his own private consultancy business called Biochar Consulting www.biochar-consulting.ca



Saskatchewan

Saskatchewan Research Council

By Michael Bendzsak, RPF

Aerial Broadcast Seeding of Jack Pine on Xeric Sites in Saskatchewan

Aerial broadcast seeding of jack pine has been used as an effective operational silviculture technique in Canada since the early 1960s and is used sporadically in isolated areas in Saskatchewan. Forest managers traditionally use seeding on suitable sites as an alternative to planting. The primary advantages over planting are reduced treatment costs and improved root system development. The main disadvantages include seed predation, drought associated germinant mortality, a need for a large quantity of viable seed, and a perception that intensive site preparation is required to expose mineral soil.

Site conditions that support broadcast seeding of jack pine are where on-site seed is limited, competing vegetation is minimal and there is a receptive seed bed. In the 1980s The Saskatchewan Ministry of Environment, Forest Service conducted some aerial broadcast seeding trials with poor results. However, reasons for poor success are not known. Beginning in 2005, the Forest Service supported further work on a trial to investigate the feasibility of aerial broadcast seeding jack pine on backlog Not Sufficiently Regenerated (NSR) sites.

The trial's goal is to evaluate the use of aerial broadcast seeding as a low cost reforestation treatment on sites with a xeric to sub-xeric moisture regime. The trial sites are in the Fort a la Corne Island Forest, located about 100 kilometres east of Prince Albert, Saskatchewan. This forest is located in the Boreal Transition Ecoregion, in the La Corne Plain Ecodistrict, and is surrounded by formerly forested agricultural land.

Local jack pine seed, with a viability of 92%, was applied by a Piper PA18A-150 Super Cub fixed wing aircraft equipped with a Brohm Seeder on May 4th and 9th, 2005. This particular aircraft has a history of broadcast seeding for both forestry and non-forestry purposes dating back to 1968. The aircraft was equipped with an AG-NAV Differential GPS navigation system, providing the pilot with seeding swath

and directional guidance information to ensure complete coverage. Flight lines were planned with a swath width of 20 m.

Experimental design focused on two different site preparation methods (TTS Delta disc trenching and barrels and chains) and three different seed application rates (50, 75 and 100 thousand seeds per hectare) on 6 different sites.

Two years of measurements show that variation in observed germinant success within each treatment is high. Mean germinant success varied from about 200 to 600 recruits per hectare between treatments. Surviving germinants showed a slight trend toward lower survival in the drag scarification compared to the disc trencher where the amount of available seedbed and exposed mineral soil appears to slightly influence germination. Seed application rate has no relationship with observed germination. Rapid soil drainage, high ground level temperatures and low relative humidity are likely causal agents of poor success.

Soils moisture availability was recorded with micro climate stations at all blocks and extended periods of drought occurred throughout the 2 year monitoring period. Interesting to note, available soil moisture was greater on the disc trenched sites than the drag scarification sites. The discrepancy between site preparation treatments started in early-June when increased temperature, low relative humidity and vegetation flush combined to accelerate moisture removal by evaporation and transpiration loss.

Observed germinant density is too low in all treatments to ensure that the sites meet the Saskatchewan Regeneration Assessment 80 % stocking standard. Therefore, all treatment blocks were planted with containerised seedlings. Planted seedlings, with pre developed root systems, are able to take advantage of moisture lower in the soil profile and have



Photo by Michael Bendzsak

a higher likelihood of survival; whereas newly emergent germinants are vulnerable to surface drying.

When the trial was planted in 2006, it was at a low density to accommodate existing recruits. Subsequent observations and regeneration surveys show there are still some NSR areas within the treatment areas that will require a fill tree plant. Low operational costs, naturally developed root systems and the ability to treat large areas in a single season are the primary advantages of direct seeding, making it an attractive silviculture treatment when successful. However, if the wrong sites are selected, unfavourable weather persists and competing vegetation is aggressive, the risk of plantation failure is high. The same year of this trial Weyerhaeuser Company also tried the same seeding methodology on 3 sites north of the Fort a la Corne Forest. Observations also indicate poor success, likely for similar reasons.

Michael is a Forester and Research Scientist with the Saskatchewan Research Council. He works to effectively support and promote conservation in Canada's forests principally through, practicing forest management and implementing successful forest regeneration. Michael is also interested in providing technical and applied knowledge to collaborative projects that enhance forest productivity and long term integrity of forest ecosystems. He can be reached at bendzsak@src.sk.ca.



Ontario

Ontario Forestry Association

By Jessica Kaknevicus

Forestry in the Classroom

National Forest Week, taking place from September 22-28, is an opportunity for Canadians to celebrate one of our greatest renewable resources - our forests!

This year the National Forest Week theme is "The Greenest Workforce", with a focus on the importance of careers in forestry including foresters, silviculturists, technicians, marketing, human resources, and engineers. This theme arises from a new initiative of the Forest Products Association of Canada who launched The Greenest Workforce this past spring by offering 6 internships in various positions related to forestry for students across Canada. The unique competition brought a new light to opportunities in forestry and the expected skills shortage in the future. Students were asked to submit video applications for the various positions, and the winner was decided by popular vote by the public. Drawing attention to the opportunities in forestry is critical in ensuring that students know their options and the paths they should take to get there.

The Ontario Forestry Association, through its Focus on Forests program, is engaging with provinces and territories to participate in "Forestry in the Classroom" being launched during National Forest Week and taking place throughout the fall. This program connects classrooms with forestry professionals to learn more about working in the field of forestry. Presenters are provided with resource materials, when requested, and are connected to a school in their area to talk about forestry.

Focus on Forests provides teaching resources that encourages teachers to bring forests into their classroom from junior through secondary studies. These free teaching resources are curriculum linked and include lesson plans on biodiversity, forest management, forest careers, wood products, ecosystems and tree biology. The goal is to create discussion in classrooms that highlight the importance of our natural resource. Encouraging teachers to use these resources to talk about forests and participate in the Forestry in the Classroom program may help to raise a generation more aware of the importance and value of our forestry resources.

Launched in the fall of 2012, Forestry in the Classroom (formerly Forester in the Classroom) worked with provincial professional foresters associations to connect foresters with classrooms. The program saw over 110 schools across Canada receive visitors in their classrooms to talk about our forests. This year we are expanding the program to include those working in the forestry field, in an effort to expand the knowledge about the range of careers available in the forestry sector. A report developed from the former Forest Products Sector Council in 2011 indicated a severe worker shortage expected in forestry in the near future. Forestry offers many different career opportunities; one of these in demand careers is expected to be in silviculture. It is essential that teachers and students are made aware of these future opportunities and that students learn more about working in that field directly from those currently involved.

The program was very well received by teachers; with many indicating that having someone speak directly about their career and forestry in their province as being well received by the students. "Having someone who chose forestry as a career coming in and talking to kids about their natural environment is appealing", remarked one teacher from Ontario.

The OFA is looking for volunteers to join the Forestry in the Classroom Database. You could be matched with a school in your area to do a presentation on your career, sustainable forestry, or just general forest information. Help create the next generation of forest workers! Visit www.focusonforests.ca or email info@focusonforests.ca to indicate your interest.

For more information about The Greenest Workforce and the resources it provides visit www.thegreenestworkforce.ca.

INVITE FORESTRY INTO YOUR CLASSROOM
 During National Forest Week
 September 22-28, 2013

Learn:
 🌲 Careers in forestry
 🌲 Forest management
 🌲 Why forestry is important

In partnership with:
 OFOREST
 Focus on Forests

www.focusonforests.ca
info@focusonforests.ca
 1-800-387-0790

Reader's Lens

Photo by Maddy MacDonald

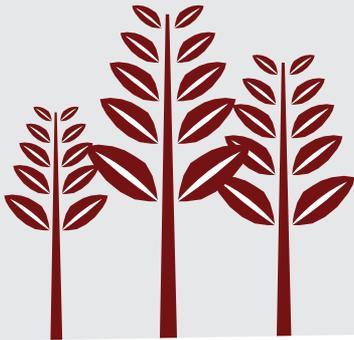


Photo by Maddy MacDonald



DO YOU HAVE A
GREAT SHOT?
We'd love to include
your photo in an
upcoming issue of
Silviculture!

Email
info@silviculturemagazine.com

Generating Revenues from Carbon Credit Sales: It's All About the Inventory

By Aldyen Donnelly

In the Spring 2013 edition of "Silviculture", John Betts made a compelling argument that British Columbia might be long past due for a forest inventory update. He also reasonably argued that before we embark on such an initiative, we should review and possibly revise our inventory goals, before we start measuring.

This came on the heels of Dirk Brinkman's piece in *Silviculture's* Fall 2012 edition, in which he argued that although global carbon quota and credit markets had, so far, failed to produce "a fresh source of funding for reforestation", that potential should still exist.

See the connection?

The keys to attracting carbon credit financing to reforestation are: revising our forest inventory goals; committing to updating our inventories and related forest carbon stock and flow forecasts every five years; publicly reporting events that might have material impacts on these forecasts on a near real-time basis, and, most importantly, ensuring that the methods we use to quantify forest project carbon credits are consistent with and directly linked to the published and regularly updated forest inventories.

But will the cost of putting the capacity in place to get these things done generate a reasonable return for investors? Brinkman reported that carbon credit revenues might add 1% to 2% to the typical 6% internal rate of return (IRR) on forest plantation projects in temperate regions. Let's put this in context. While oil and gas and mineral resource-based industries might generate significantly higher IRRs over select 2- to 5-year intervals, after we net out the impact

of preferential tax treatment for capital invested in resource extraction—much of which preferential treatment is scheduled for elimination over the next few years under Canada's existing federal budget—the 10- to 15- year rolling average IRR for investors in most oil, gas and mineral plays is in the 3% to 7% range.

In other words, investment in forest management should, all other things being equal, already be attractive to well-informed investors with long-term views, if not make them downright giddy! So why aren't they?

Some would argue that few long-view investors do have the appetite for the risk associated with either reforestation or carbon credit markets, let alone a combination of the two. But investors do not shy away from risk. They shy away from inestimable risk. Inestimable risk is unmanageable risk.

Risk of fires, pest infestations and land use policy changes, combined with what appear to be interminable material changes in carbon accounting methodologies and carbon credit price volatility, are significant. But they should be manageable. To discuss how to manage these risks, let's deal with natural hazard and forest inventory risk first, and then carbon accounting risk.

At this time natural hazard risk impacts on fibre supply and carbon stocks are not quantifiable within an acceptable uncertainty range, largely because fibre supply estimates are so unreliable and so infrequently updated. Expert analysis suggests that the estimation error in our current (now quite dated) fibre supply

estimates might be as much as 30% to 60%. The estimation error in the existing fibre supply estimates can overwhelm any uncertainty in our ability to forecast natural disaster events.

With the evolution of satellite and aerial imaging and soil/site sampling methodologies that we have witnessed over the last decade, we are now in a position to publish and regularly update our forest inventories at a scale and reliably enough to support carbon credit verification, at a cost that is not prohibitive.

Assuming, solely for purposes of illustration, that forest management could generate an incremental 10 cubic meters of net new fibre cover per hectare per year, averaged over 25-35 years of land management, and that 50% of the incremental fibre is carbon (whether the cover is in the form of pine trees or switchgrass), if we hiked the Province of British Columbia's recent \$8.4 million per year forest inventory and research budget to, say, \$25 million per year, that translates into administration costs equal to: 48 cents per hectare of British Columbia certified forest area, per year: or \$1.15 for each hectare of BC forest that is currently available for harvest, each year. Even if carbon credits trade for only \$7/TCO₂e, at only 1% to 2% of the market price for credits, such a massively expanded forest inventory and research budget represents a very small administration cost for carbon credit trade.

Today, in fact, accepted forest carbon project validation and verification procedures typically eat up 30% to 60% of the gross market price for forest carbon credits. These forest carbon



marking-killing transaction/overhead costs are primarily due to the deficiencies in and infrequent updating of our forest inventories and fibre supply forecasts. In the absence of regularly updated, reliable and relatively high resolution forest inventories and forecasts, significant resources have to be committed to craft and re-validate reasonable (but still highly theoretical, and too often highly politicized) forest carbon “baselines” to enable carbon credit quantification to proceed. Forest and carbon market leaders should enter into partnerships with our governments to jointly design, execute and publish new forest inventory/monitoring initiatives with a view to displacing current cost-prohibitive carbon credit-generating project validation exercises and reducing combined project validation and verification costs from over 40% to under 5% of a low benchmark price for carbon.

The price most carbon market participants are willing to pay for forest project carbon credits is lower than that which they are willing to pay to reduce greenhouse gases in their own operations, develop renewable energy supplies and/or buy carbon credits from fuel switching, alternative energy and energy efficiency projects. The current price discount for forest project carbon credits largely (but not completely) reflects uncertainty that derives from complex, confusing and ever-changing “widely-accepted” forest carbon baseline and credit quantification methodologies.

Even the most respected, market-friendly guidance documents that carbon market leaders present to potential forest project investors stress that forest carbon baseline and credit quantification methods will

continue to change, quickly, for the foreseeable future. Investors are advised to “anticipate” changes in quantification methods. Most of the time, the direct result of this legitimate warning is that investors elect to put their money elsewhere.

It is not necessary to scare investors away from forest management projects that have such significant potential to store incremental carbon.

Once we have put in place the capacity to produce and regularly update highly credible, comparatively high resolution fibre supply forecasts, as well as a commitment to the timely publication of a best estimate of the potential impacts (within wide uncertainty ranges) of unplanned events on existing fibre supply forecasts, we can potentially dispense with a large portion of the costly carbon baseline-setting and project validation processes that eat up too much of the limited carbon credit price available to forest managers.

But reliable forest inventories and fibre supply forecasts, by definition, incorporate assumptions about harvest rates, fires, pest infestations and carbon stock changes due to forest preservation. Once those assumptions are disclosed and updated, say, every 5 years, the related published fibre supply forecasts define the baselines against which incremental forest project carbon stock gains can be measured. More important than the role the published inventories and forecasts will play in reducing eligible project validation and verification costs, this procedure can mitigate if not eliminate the discount that carbon market participants currently assign to forest project credits.

When investors know that the official forest inventories and forecasts will be updated every five years, they will employ tried-and-true contracting and risk hedging tools to anticipate and address risks associated with changes in the fibre supply forecasts that might occur. The inventory and forecasting process does not need to eliminate investor risk. It needs to position investors to quantify, predict the timing of and hedge against risk.

Carbon credit accounting methods that are not anchored in a transparent, predictable, credible and accessible forest inventory and forecasting procedure fail on two fronts: they are cost prohibitive and, by their very nature, they scare away investors. In Canada, we can get the structure of forest carbon markets right, ahead of all other jurisdictions. And it should cost us less than \$1.25 per tonne of incremental carbon stored to get the ball rolling. With this infrastructure in place, we can reasonably expect to see forest management IRRs bloom at carbon credit prices well below British Columbia’s existing \$30/TCO₂e carbon tax rate. †

Aldyen Donnelly is the President of WDA Consulting Inc. which focuses on: development, adoption and commercialization of new technology, especially as it relates to achieving energy efficiency and greenhouse gas reduction objectives; development of commercial responses to emerging and anticipated public policy; major project development and environmental impact assessment; sustainable development reporting; and the development of corporate training programmes to enhance staff abilities to assess and address environmental risks and challenges. She can be reached at aldyen@gemco.org.

Mountain Pine Beetle: A Nation Involved

By Erica Samis and Brenda Eeglon



Lodgepole pine being sampled to determine over-winter mortality. Photo credit Government of Alberta, Environment and Sustainable Resource Development.

With the expansion of mountain pine beetle into ranges not seen previously, forest health specialists, researchers and the forest industry have joined forces to share information and suggest options for management.

Mountain Pine Beetle in Alberta

Alberta began managing mountain pine beetle (MPB) in earnest after the occurrence of a large infestation in 2006 that increased the number of infested trees by literally tens of thousands in a single year. Prior to this infestation, less than 1,000 infested trees were detected and treated in Alberta on an annual basis. Due to historical trends, it is fair to say that forest health specialists in Alberta had limited knowledge and experience managing mountain pine beetle on such a large scale. As a result, collaborations and partnerships with forest health specialists and researchers in British Columbia were developed in an effort to fully understand potential impacts, management options, and information gaps. Based on knowledge and advice gained, Alberta wrote the *Alberta Mountain Pine Beetle Action Plan* outlining the goals and priorities for the Government of Alberta's MPB management program. Under this action plan, a short-term Beetle Strategy and long-term Pine Strategy were implemented, and the Mountain Pine Beetle Decision Support System – a tool that prioritizes direct beetle control efforts based on biological risk of spread at each beetle site in the province was developed.

Since 2006, forest health specialists in Alberta have acquired vast knowledge and experience in managing mountain pine beetle populations. Much of Alberta's experience with mountain pine beetle has been unique because of differences in



host/beetle dynamics, climate variations and large influx events (inflight). The management program has remained virtually the same since 2006, but has adapted based on new science, information or trends observed over the past 7 years.

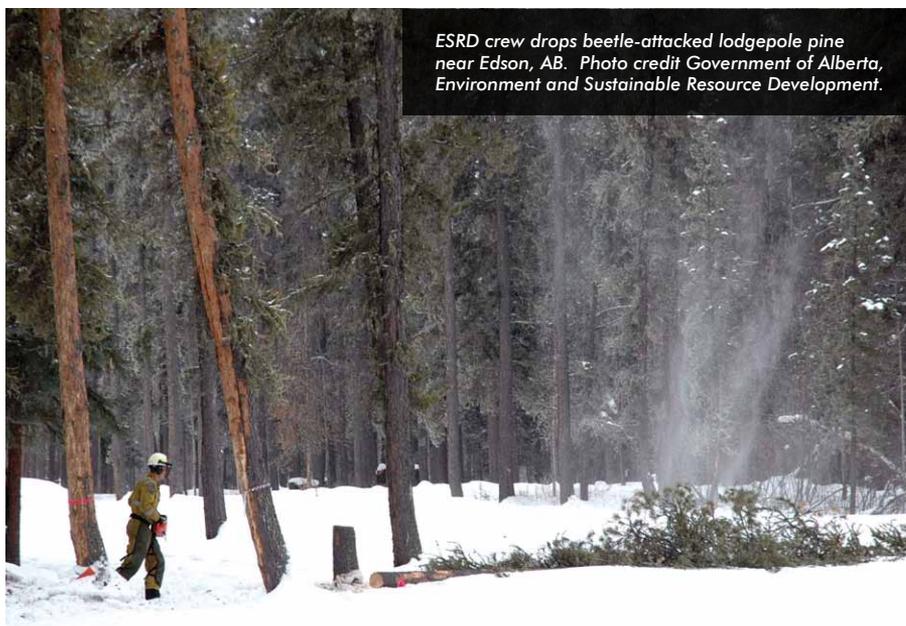
Expansion of Range

In Alberta, the range of mountain pine beetle is slowly expanding to the north, and to the east. Neighbouring provinces and territories have taken an interest in management principles, and new science and information regarding beetle population spread and survival in Alberta. In 2010, with funding from the Canadian Council of Forest Ministers, Alberta hosted a national workshop to provide forest management executives and forest health professionals from across Canada, the chance to experience and discuss the risk of spread, potential impacts and management responses for mountain pine beetle.

Collaboration with other Jurisdictions

Yukon Territory conducted a Risk Assessment Workshop in 2011 to provide stakeholders information regarding mountain pine beetle management in other jurisdictions and potential risks and impacts. Stakeholders were asked to provide ideas on potential impacts to the territories and how beetle infestations may affect them. Alberta forest health specialists were invited to attend this workshop to present on the Government of Alberta's mountain pine beetle management program.

In 2010, Alberta and Northwest Territories began a joint pheromone monitoring program. In 2012, beetles were detected for the first time in the Northwest Territories



through this program. In February of this year, Alberta's Forest Health Manager travelled to the Northwest Territories where he was asked to share information with forestry executives and forest health specialists on potential impacts, the current program in Alberta and lessons learned to date.

The Alberta-Saskatchewan Spread Management Action Committee (SMAC) was formed in 2010 with a prime objective of supporting mountain pine beetle control to stop spread eastward through boreal pine forests in Alberta, into Saskatchewan and beyond. Work plans benefitting both provinces and meeting each partners' goals were developed and actions implemented. Although this work was completed in Alberta, Saskatchewan provided funding for actions outlined in the work plan. This work will continue with the development of

a 2013/2014 work plan this fall.

The National Forest Pest Strategy has initiated the development of a science-based, national strategic response plan to slow the spread across Canada. This initiative will look at; the current status of mountain pine beetle with recent spread northwards and eastwards, identify factors influencing spread including an assessment of control activity effectiveness, review the latest national MPB Risk Assessment, and build the framework for an operational National Mountain Pine Beetle Management Strategy.

Management of Mountain Pine Beetle

Direct control of beetle populations is a cooperative effort between the provincial government, the forest industry and municipal governments. All three land

managers must coordinate treatment efforts in order to successfully treat populations. In Alberta, the provincial government focuses efforts towards Level 1 Control, or single tree treatment of individually infested trees. The forest industry focuses on Level 2 Control, or the harvesting of infested trees through stand-level harvesting. Level 1 and Level 2 plans are coordinated on an annual basis to ensure an effective use of resources that treats as many high risk sites as possible. Municipal governments have the option to apply for a provincial grant that financially supports survey and control work on municipal and private lands.

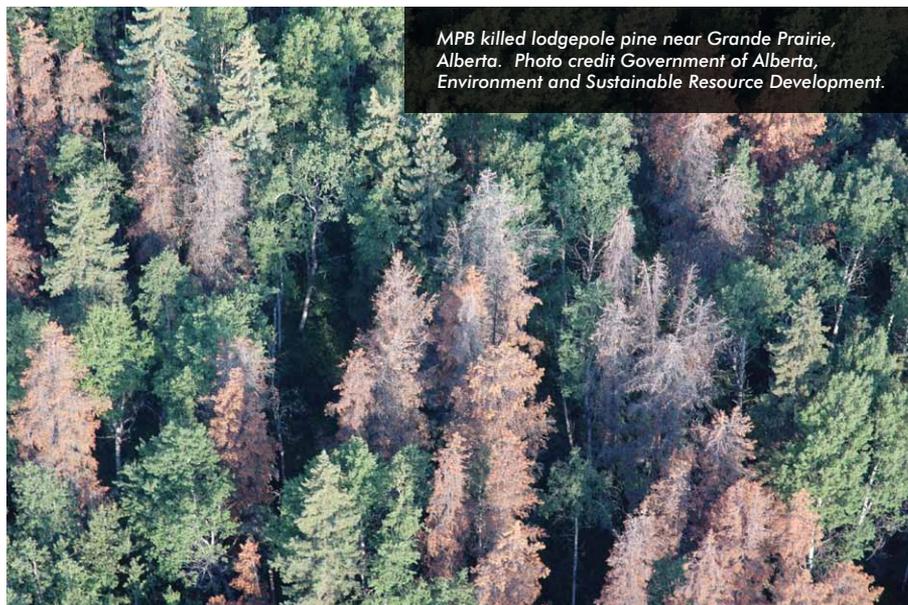
Research

Because Alberta has been outside of the natural range of mountain pine beetle, information gaps exist on issues such phenology, tree host differences, impacts to hydrography and regeneration in effected stands. The Foothills Research Institute (FRI) started the Mountain Pine Beetle Ecology Program in 2007 as a way to address these issues. Together, the government of Alberta, the federal government and the forest industry set research priorities, and communicate these priorities to researchers. Funding to address priorities are available through the Foothills Research Institute and will provide valuable knowledge to land managers on how best to adapt all aspects of mountain pine beetle management now, and into the future.

Communication, Building Awareness and Education

Communication remains an important element of Alberta's management program. It is a priority of Alberta's MPB management program to support our stakeholders by providing them with a well-informed, coordinated and accountable decision making process and ensure they understand what is being done, and how they can contribute to future decisions.

Albertans experience the infestation differently depending on which area of the province they reside, therefore; recent efforts focus on impacts at a regional level. Building awareness assists Albertans to understand the infestation, how it may affect them and provides steps



MPB killed lodgepole pine near Grande Prairie, Alberta. Photo credit Government of Alberta, Environment and Sustainable Resource Development.

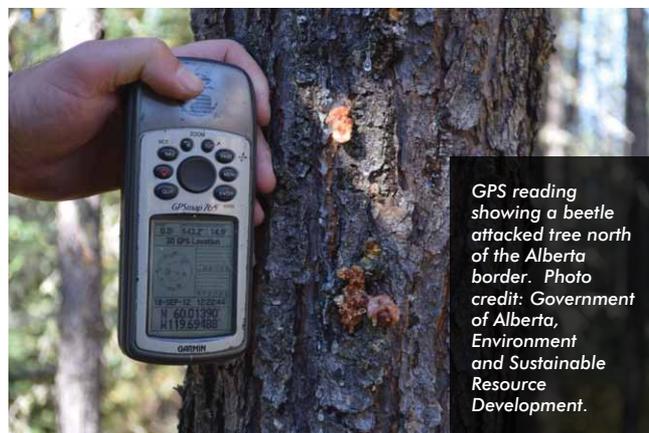
they can take towards mitigating damage to their property and prevent further spread.

Youth outreach and education is done primarily through the education system with strong links into Alberta's curriculum. Recognizing that mountain pine beetle may become a more prominent national issue, the MPB Communications Team recently translated a publication into French in an effort to extend our reach both within Alberta's education system, and beyond our borders.

In Summary

The large inflight into Alberta in 2006 created conditions that required a very rapid and coordinated response. Forest health specialists in Alberta responded to this challenge by pulling from their own expertise, and combining that with meaningful input from colleagues and stakeholders within other jurisdictions, industry and researchers.

Management of this forest pest cannot be done successfully by any one land manager or jurisdiction. Collaboration is essential both internally and externally



GPS reading showing a beetle attacked tree north of the Alberta border. Photo credit: Government of Alberta, Environment and Sustainable Resource Development.

with other government departments, levels of government, jurisdictions and the forest industry. This model of collaboration will continue to be essential with the expansion of range into northern and eastern Canada. †

Erica Samis is a Senior Forest Health Officer with the Government of Alberta. She draws on 15 years of experience working in forest health and moved into Edmonton from Hinton in the spring of 2007 to assist the development of a provincially coordinated program. Erica can be reached at erica.samis@gov.ab.ca

Brenda has been involved in environmental education and outreach for over 13 years and currently works with the Government of Alberta to assist with coordination of public outreach and education initiatives. She can be reached at brenda.eeglon@gov.ab.ca.

For more information on Alberta's MPB management program, please visit www.mpb.alberta.ca