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Atlantic Forestry Review

Volume 25 #3 January 2019

Published by Dvl. Publishing Inc.
Box 1509 Liverpool, N.S. B0T 1K0
1-877-354-3764 www.RuralLife.ca

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Circulation

Daphne Miller

Published and printed in Canada.

Tax Registration No.: 127869261

Material in *Atlantic Forestry Review* is protected by North

American copyright reg. desig. ISSN #1196-9919

Publications Mail Agreement No.: 40051580

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Lahey implementation brings uncertainty, high hopes, intellectual honesty

After studying Bill Lahey's forestry review report for more than three months, the Nova Scotia government came through with an official response on Dec. 3, announcing its intention to fully embrace a new "ecological forestry" paradigm and to implement the "triad" approach (whereby land is designated either for conservation, for high-production timber management, or as "matrix" forest where multi-aged management prevails).

Iain Rankin, the minister of Lands and Forestry, indicated that he accepts all 45 of Lahey's recommendations, which are mostly directed at Crown land. "The months and years ahead will be a time of transition," he said, alluding to the fact that these changes will not occur overnight. In fact, most of the details have yet to be hammered out. There are quite a few unknowns – both for industry players, and for members of the general public seeking concrete evidence that the promised transition will actually transpire.

In the year to come, the province will draw on external expert advice to revise the Forest Management Guide for Crown land, with greater emphasis on ecological values. A related task, also involving outside scientific expertise, will be a peer review of the department's Natural Disturbance Regimes mapping and methodology (which are widely understood to have mischaracterized a lot of forest, leading to a preponderance of clearcutting prescriptions). The pre-treatment assessment process is slated for revision as well, with greater emphasis on protecting wildlife habitat and species at risk.

A legislative framework for this more ecological approach will arrive this year in the form of a Biodiversity Act. The government has also committed to reviewing the Crown Lands Act.

Despite the general shift toward more natural and diverse forest conditions on Crown land, some Crown woodland will be devoted to intensive forestry (as per the triad), where herbicide use will be allowed but not publicly funded (as was the case already). Identifying areas suitable for this purpose is also near the top of the to-do list.

The province has stated, somewhat vaguely, that it will "establish options" for independent environmental reviews of proposed long-term Crown licences, with some mechanism for public involvement. In the meantime, Crown licences will be extended for a year, though licensees will be required to follow the Interim Retention Guide, which is aimed at steering harvest practices toward multi-age management. Until the Forest Management Guide (FMG) has been revised, prescriptions for clearcuts (i.e., "overstory removal" or "seed tree harvest") must be modified, to leave a certain proportion of the trees standing on the treatment block. The objective is to foster diversity, notably through the retention and regeneration of "late successional intermediate to tolerant" (LIT) species, which include Eastern hemlock, Red spruce, White pine, White spruce (except on old-field or coastal sites), Red maple (on tolerant hardwood sites) Red oak, Sugar maple, Yellow birch, and White ash.

In stands where these species predominate, the existing FMG already calls for partial-harvest treatments. Where LIT species make up a smaller proportion of the stand, the Interim Retention Guide serves the modest objective

of leaving some of them standing. There is a sliding scale: "Where greater than 30 percent of the pre-treatment stock is LIT species, approximately 30 percent of the stand should be retained; if the stand initially contains 10-30 percent LIT species, approximately 20 percent of the stand should be retained; if less than 10 percent of the stand is LIT species, approximately 10 percent of the stand should be retained." The interim guide also calls for at least 20 percent retention on stands underlain by shallow or stony soil. Priority is given to retaining uncommon tree species, wind-firm species, and individual trees with valuable wildlife or biodiversity attributes.

"It is surprising to me that there is so little information there on which the landowner groups, and small landowners themselves, can make decisions."

— Andrew Kekacs, NSWOOA executive director

PRIVATE WOODLOT ROLE?

Other promised initiatives stemming from Lahey's recommendations include a review of Crown and private silviculture programs; a larger role for peer-reviewed and external scientific expertise in research and program development; an improved State of the Forest Report, with input from the academic community; exploring opportunities for small-scale wood energy projects; and cooperation with private woodlot organizations, as the changes are rolled out.

One of those organizations is the Nova Scotia Woodlot Owners and Operators Association, a group that is celebrating its 50th anniversary this year. Andrew Kekacs, the executive director, followed the Lahey review closely, taking every opportunity to provide input on behalf of his membership. His was one of 12 woodlot service organizations in the province that co-signed a letter to Premier Stephen McNeil endorsing the report in its entirety, so he was keenly awaiting the provincial government's response.

"It is surprising to me that there is so little information there on which the landowner groups, and small landowners themselves, can make decisions. I understand that the province wants to implement on Crown land first, and that's probably wise, but this creates an extended period of uncertainty, which will make it hard for landowners and landowner service providers to make decisions about how they should be managing their forests," says Kekacs.

"We understand what ecological forestry is. Our philosophy of forest management was written 15 years ago, and it basically mirrors what Lahey said. It's really quite compelling, what we wrote way back then. But it's unclear what the carrots and sticks might be. By that I mean access to silviculture funding, support for treatments or activities of other kinds, impact on accessibility to property tax classifications that benefit landowners – there are a number of things that could potentially be brought to bear here, and it's unfortunate that we're not clear what's on the table and what's off the table.

I'm not deeply critical; I'm just saying that if it takes a year to work out what's going on on private lands, then that's going to be a pretty uncertain year for a lot of landowners."

TRIAD

Kekacs is a huge fan of triad forestry. A former Mainer, he was around when U. Maine professors Bob Seymour and Mac Hunter – both members of Lahey's expert panel – received a 1995 Pew Fellowship for their work on maintaining forest biodiversity, which brought the triad concept to prominence. "It was a really big deal," he recalls. "Ultimately, they were trying to raise the bar for forest practices across the landscape; create room for conservation reserves, which they felt were desperately needed in Maine, which has a much higher percentage of private land ownership than Nova Scotia does; and then create some kind of incentive for industry to support it, through the location of intensive industry parcels on a small sub-set of ideally suitable forest sites."

The way Kekacs sees it, the acreage devoted to intensive management in Nova Scotia should be comparable to the acreage under protection – about 15 percent of the land base – leaving about 70 percent to be managed ecologically. "We have a unique opportunity here," he says. "I'm unaware of any other jurisdiction in North America that has established the triad concept as a defining method for forestry. This would, in my opinion, put us at the forefront of forested places with regulatory systems that support good forestry. I mean, Nova Scotia can shine."

Making it work hinges on getting a lot of quality-improvement treatments done for private landowners, which is a tall order, because woodlot service providers cannot even meet current demand. "We have a really, really long way to go," Kekacs says. But he sees the potential for a big payoff.

"We could have a situation where, theoretically, we could have more land under light management, with a greater flow of higher-value wood, because that's what ecological forestry is going to do for us," he says. "It's built around the fact that older, more valuable forests will allow us the economic returns, through higher-value wood products, to make this whole thing happen.... It's pretty well demonstrated that growing more valuable, higher-quality climax species is not only consistent with the natural growth of the forest, but it also yields higher value for the small landowner."

Though he is too diplomatic to say so out loud, Kekacs, like many others in this business, likely also appreciates the fact that the triad model is refreshingly honest. The industrial farmer who grows a crop of corn or potatoes knows that his field is an ecological wasteland, and he does not feel a need to make the outlandish claim that his cultivation practices mimic natural processes.

There must be quite a few government and industry foresters in Nova Scotia who are actually relieved that they will no longer have to keep up the pretence that even the most intensive management practices – leaving little diversity of species or structure or age class – are ecologically sound. DL

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Better process?

AFR: With all the controversy about the treatment of waste from the Abercrombie mill, one thing has been largely ignored.

In the 50 years since the mill was built, processes have changed in a lot of mills. A number of the mills used to have groundwood processes that used about one cord of wood for a ton of pulp. Then industry wanted stronger and whiter paper, and the sulfite and kraft processes were used. Abercrombie uses the kraft process. Those chemical processes use over two cords of wood to get a ton of pulp. And the waste from the chemical processes in the air and the water is something that nobody has really made acceptable.

In the later 1980s and the 1990s, both Stora and Bowater switched most of the process to a process using mostly steam, called thermomechanical. This process vastly reduced the amount of wood used to make a ton of pulp. I remember that Bowater was able to sell a vast tract of their woodland that they no longer needed to Irving in Yarmouth and Digby counties. At the same time, they reduced their haul distances. The sludge from treatment of the waste was burned in the mill boiler, and the whole process had a better smell.

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If the province and Northern Pulp have had half a century to fail in providing clean air and clean waste from the kraft process, it is high time to look at changing the process. It is sure hard to really believe anything they tell us about any new treatment of the same old chemical product. And changing the process itself could save a heck of a lot of clearcutting.

Charles Jess
Yarmouth, N.S.

(Thanks for sharing your thoughts on this, Charles. Northern Pulp has asserted that there is no feasible closed-loop technology to produce bleached kraft, the specific product for which the company has specific markets, for use in papermaking in Asia. Whether there may be different technologies on the horizon, or market opportunities with a different product, are questions that warrant closer consideration. DL)

Prefers paper

AFR: I would like to see more on alternate uses for forests and forest products, forest management cooperatives, small-scale sawmilling, re-forestation, and tree planting.

I really like all of your publications. I hope you remain a healthy publisher for a long time. I much prefer paper publications as opposed to "on-line." I look forward to receiving your publications in the mail.

Keep up the good work.
Christian Kroeger
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NEW PRODUCTS

AND INDUSTRY NEWS

Sound wood

Holocellulose makes recycled speaker design recyclable

Tree-hugging audiophiles now have reason to rejoice, sonically and sustainably. A cooperative effort between the Swedish consumer electronics manufacturing company Teenage Engineering and RISE (Research Institutes of Sweden) has produced a reproduction of a ground-breaking 1970s audio speaker known as the OD-11. And this time it's recyclable.

It is the first speaker cabinet made of holocellulose – the total fraction of cellulose and all of the hemicelluloses, obtained by removing the extractives and lignin from wood fibre – which replaces the cast fibre-glass reinforced plastic baffle that housed the original OD-11 speaker. The material was developed by researchers at RISE through an innovative process intended to control whiteness in wood. The end result is free from additives such as paint or dye. In preliminary tests, the holocellulose doesn't yellow with ageing like paper does, or turn grey like wood does when exposed to air and sunlight, but instead remains completely white.

Since there are no additives, it is an ideal material for recycling into apparel or film.

The OD, or ortho-dynamic loudspeaker, was the brainchild of Swedish sound genius Stig Carlsson in 1974. Until then, speakers had been designed to provide superior audio in an echo-free (anechoic) chamber. In that space, a flat frequency response curve could be achieved – the proof of pure, direct sound. However, when speakers were placed in a real-world environment like a living room, the sound was distorted due to reflections from various objects and surfaces – an effect compounded by the sound waves crashing into each other repeatedly, causing them to reach the listener's

ear at slightly different rates. The result is a jumble that the brain has difficulty interpreting, and which the listener hears as poor sound quality.

In Carlsson's OD cube speakers, through unique angled positioning, the number of tweeters in the box was minimized, producing superior sound output and quality. The smallest model had just one peerless cone tweeter and one mid-woofer, hence the number 11 designation (1+1). The OD-11 generated great sound, despite its small format, thanks to its high-end, built-in frequency filter and ground-breaking box construction that featured recessed, angled speakers. It directed the sound diagonally – sideways, upwards, and outwards – resulting in full-bodied, natural, and evenly distributed stereo sound.

The redesign of the OD-11 retains the original's simple lines and its compact size. It is available in several standard colours, or in rosewood, walnut, teak, or the holocellulose version. Featuring a 100-watt amplifier and a built-in computer,

the OD-11 can wi-fi stream, and can play music from any device.

"Teenage Engineering and RISE both share the vision of creating a more sustainable society, and we play different roles in making that happen," says Dina Dedic, research leader at RISE. "For us, it's a lot about developing materials that are useful for companies like Teenage Engineering, while being sustainably sourced and viable for manufacturers to produce in an environmentally friendly way. Challenges remain with products like the OD-11 since it still contains materials like metal and glue that complicate recycling, but this is a big step in the right direction."



Chips 'n' Slabs

Items of interest from the region and beyond

Chips for grip

This winter the City of Saskatoon is testing wood chips as a possible substitute for road sand and salt. The pilot project is being conducted in the city's North Industrial Area, based on reports of promising results with wood chips used to improve road traction in cities in Switzerland and Quebec. Brandon Harris, Saskatoon's roadways director, told the local CBC Radio morning program that the chips – a byproduct of municipal works activities such as grinding stumps from fallen trees – offer potential environmental benefits, but the city wants to find out if there are any disadvantages. "We have to make sure the traction is as good as sand, and we have to make sure we won't be plugging up catch basins," he said. "The last thing we want is for spring to roll around and us to have a whole problem with getting rid of water." He predicted that the chips will wash away readily in spring, avoiding dust issues associated with residual road sand.

Protecting Cornell's ash

This past fall, 47 high-priority ash trees on the renowned Cornell University campus in Ithaca, N.Y., were treated to protect them from the Emerald ash borer (EAB), which had recently been discovered infesting trees in the Cornell Botanic Gardens arboretum. Trees were chosen for protection based on their size, location relative to buildings and trails, their condition and health, and their ecological value, said Todd Bittner, director of natural areas with the Botanic Gardens. Risk assessment and removal plans are in the works for other ash trees on campus, of which there are an estimated 2,600. The injectable insecticide treatments, which typically offer protection for two to three years, were donated by Arborjet, as part of the Massachusetts company's Saving America's Iconic Trees Tour.

Pellet plant fire

There were no accounts of injuries

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resulting from a Dec. 9 fire at Great Northern Pellets in Upper Musquodoboit, N.S. The plant was recently restarted by Great Northern Timber, which purchased it following the failure of Viridis Energy Inc. in 2016. The *Chronicle Herald* reported that several fire departments – from as far away as Sheet Harbour, Enfield, and Stewiacke – came to help extinguish two pellet-storage buildings that were ablaze. Thor Olesen, CEO of Great Northern Timber Resources, told the paper that safety equipment and emergency procedures worked as intended, ensuring minimal damage, and he said the mill would be operational again within a few days.

First Nations forestry

A Dec. 18 announcement from Natural Resources Canada outlined funding for two Indigenous forest sector projects in New Brunswick. The first is a multi-year investment of \$255,000 to help the Tobique First Nation establish a forest-based business. Part of this funding has already gone toward an analysis of manufacturing options in the community, leading to the purchase of a sawmill in Perth-Andover. The next phase of the funding will go toward developing standard operating procedures, training in grading and stamping lumber, and management succession planning for the mill, with the objective of creating more local jobs.

A second investment of \$40,000 is aimed at helping Mi'gmawe'I Tplu'taqnn Incorporated launch a sustainable forestry strategy for its nine member communities, to identify manufacturing options and other opportunities. Both projects are funded by the Indigenous Forestry Initiative, which is part of Canada's Softwood Lumber Action Plan. Amarjeet Sohi, the federal minister of Natural Resources, issued a statement saying the projects "will directly benefit Indigenous communities by helping individuals acquire the skills and knowledge needed to participate more fully in the forest sector and contribute to the overall competitiveness of the economy."



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R&D overview in the great outdoors

Field workshop touches on drones, LIDAR, forest regeneration

Sunny weather prevailed for a Nov. 8 R&D workshop at the Acadia Research Forest in Noonan, just northeast of Fredericton, N.B. Billed as “Research and Development to Sustain Forest Fibre Supply in a Changing Climate,” the event was co-hosted by the Canadian Wood Fibre Centre (Natural Resources Canada) and Canadian Woodlands Forum. More than 70 people attended, including some who travelled from Nova Scotia and Maine.

The first presentations dealt with LIDAR, combining forestry research and some history of the Second World War internment and POW camp that was situated on this federal property. Adam Dick, a researcher at the Wood Fibre Centre, compared a 1945 orthophoto with a current LIDAR image that picked up remnants of the camp currently sleeping under a dense tree canopy.

Dick and other researchers led the group through a number of different



Anthony Taylor, a Canadian Forest Service research scientist, gives a presentation on climate change during the technical workshop held Nov. 8 at the Acadia Research Forest in Noonan, near Fredericton, N.B. (George Fullerton photos)



Tim Keddy, with the Canadian Wood Fibre Centre, spoke about partial cutting and underplanting.

research plots, and explained LIDAR use for inventory, watercourse identification, impacts of climate change, and wildlife habitat monitoring.

The luncheon speaker was Jim Bowen, an instructor at the Maritime College of Forest Technology, who provided an overview of the use of unmanned aerial vehicles (UAVs) in forestry, covering licensing and other regulatory issues. In early afternoon the group visited a plantation, where there was discussion of site preparation and chemical competition control, and a review of risk assessment relating to pesticide use.

The last stop on the tour touched on management strategies for low-grade stands, including site preparation and underplanting. By the end of the day, participants had enjoyed a comprehensive update on forestry research – and with the wind picking up and showers threatening, wet autumn conditions resumed. GF



One of the machine demos featured a mulching head used to scarify partial-cut sites in preparation for underplanting.



The roster of expert presenters included Greta Goodine, a field nursery technician with the Canadian Forest Service.



Billed as “Research and Development to Sustain Forest Fibre Supply in a Changing Climate,” the field workshop was co-hosted by the Canadian Wood Fibre Centre (Natural Resources Canada) and Canadian Woodlands Forum.

Jan. 15-17: Atlantic Canada Forest Health Workshop 2019, Mapleton Park Lodge, Moncton, N.B. Visit arprfnb.ca/events/.

Jan. 23-24: Mapping the Course: Timberlands, Forest Products Processing, and Fibre Issues 2019, Heathman Lodge, Vancouver, Wash. Sixth annual conference will provide an in-depth analysis of forest products market challenges, opportunities, and threats for 2019. For more information visit westernforestry.org.

Jan. 26: Canadian Intercollegiate Lumberjacking Association (CILA) Competition, Macdonald Campus, McGill University, Sainte-Anne-de-Bellevue, Que. Visit www.cilawoodsmen.ca for details.

Jan. 29-30: Forest Nova Scotia 85th AGM, Halifax Marriott Harbourfront Hotel, Halifax, N.S. Phone 902-895-1179 or visit forestns.ca or visit forestns.ca.

Jan. 31: Canada Safety Council Certified Snowmobile Training, Maritime College of Forest Technology, Fredericton, N.B. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Feb. 4-7: PaperWeek, Fairmont Queen Elizabeth Hotel, Montreal, Que. Annual Conference of the Canadian Pulp and Paper Industry, includes Tissue Masters, TechPack, PulpEx, and BIOFOR International. See www.paperweek-canada.ca.

Feb. 6-8: Lumber and Building Materials Expo 2019, Hynes Convention Center, Boston, Mass. Visit www.lbmexpo.com.

Feb. 8-9: Canada Safety Council Certified Snowmobile Training, Maritime College of Forest Technology, Fredericton, N.B. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Feb. 9: Canadian Intercollegiate Lumberjacking Association (CILA) Competition, Dalhousie Agricultural College, Truro, N.S. Visit www.cilawoodsmen.ca for details.

Feb. 11-15: N.S. Watercourse Alteration Certification for sizers (Feb. 11-13) and installers (Feb. 13-15), Best Western Glengarry, Truro, N.S., offered by Maritime College of Forest Technology. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Feb. 19-21: International Builders' Show, Las Vegas Convention Center, Las Vegas, Nev. Presented by the National Association of Home Builders. Visit www.buildersshow.com.

Feb. 20-21: Introduction to LiDAR Based Enhanced Forest Inventory (EFI), Terrain and Surface Products for Forest Professionals, Maritime College of Forest Technology, Fredericton, N.B. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Feb. 21-23: FNSWO Information Sessions, Halifax, Hants, Colchester, Pictou, and Cumberland Counties, N.S. Visit www.fnswo.ca.

Mar. 4-8: N.B. Watercourse Alteration Certification, Maritime College of Forest Technology, Fredericton, N.B. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Mar 5-7: Certified Basic Chainsaw Safety, Operation, and Management, Maritime College of Forest Technology, Fredericton, N.B. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Mar. 7-9: Atlantic Farm Mechanization Show, Moncton Coliseum Complex, Moncton, N.B. Visit www.farmmechshow.com, email info@farmmechshow.com or phone 506-856-9898.

Mar. 14: ARPFNB AGM Fredericton Convention Centre, Fredericton, N.B. Phone 506-452-6933 or visit www.arprfnb.ca.

Mar. 18-20: International Biomass Conference and Exhibition, Savannah International Trade & Convention Center, Savannah, GA. Visit www.biomassconference.com.

Mar. 18-22: N.S. Watercourse Alteration Certification for sizers (Mar. 18-20) and installers (Mar. 20-22), Best Western Glengarry, Truro, N.S., offered by Maritime College of Forest Technology. For details phone 506-458-0649, email ce@mcft.ca, or visit ce.mcft.ca.

Mar. 19-21: Montreal Wood Convention, Fairmont Queen Elizabeth Hotel, Montreal, Que. Presented by Quebec Wood Export Bureau, Québec Forest Industry Council, Maritime Lumber Bureau (MLB), and Ontario Forest Industries Association. Visit www.montrealwoodconvention.com/en/.

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Recruitment drive

Hardwood management must reverse encroachment by low-value species



Prolific beech stump sprouts resulting from a partial harvest. In the dormant season (fall and winter), resources are stored in the root system, awaiting the next growing season. (Northern Hardwoods Research Institute photo)

by Gaetan Pelletier

Hardwood-dominated forests continue to be an important part of Eastern Canada's economy, providing saw logs and pulpwood, as well as non-timber forest products. They also play an important role in terms of wildlife habitat and biodiversity, as well as carbon sequestration and climate-change mitigation. Managing hardwoods requires well-planned treatments that not only tend and improve existing trees but also regenerate desirable species. The successful recruitment of new cohorts of key tree species is vital to sustain our resource.

It is generally accepted that, for hardwoods, timber value is driven by the proportion of high-grade products, such as veneer logs and prime or select saw logs. The value differential between these products and hardwood pulpwood or biomass can be almost ten-fold – more than five times the differential between high-grade

and low-grade softwood products.

Just how well are our hardwood-dominated forests doing in the Atlantic region? Well, from a timber standpoint, not that great. Species composition, stocking, tree quality, vigour, health, and growth rates are some of the factors we consider critical to the production of timber. Careful examination of the attributes of hardwood-dominated stands reveals some challenges for land owners and managers. However, the good news is that through silviculture, these problems can be controlled, mitigated, and even eliminated.

COMPOSITION CHANGE

Currently, one of the biggest issues facing our hardwood forests is the undeniable change in species composition over time. It is happening at the expense of our prime tolerant hardwood species – Sugar maple – which happens to be one of the

most demanding in terms of site, environment, and climate conditions. Sugar maple can be severely impacted by drought, and by thawing-freezing cycles during the winter; it is highly sensitive with respect to moisture, temperature, and nutrients (Figure 1).

A review of 20 years of inventory data and re-measurements of permanent sample plots in the Maritime provinces shows that, on average, the proportion of mature and commercial-size Sugar maple in our working forests has declined by more than 20 percent (Figure 2). This alarming trend seems to be mostly caused by relatively unsuccessful recruitment of new cohorts to promote seedlings and saplings into larger tree sizes.

So, what species are taking over the niche once occupied by Sugar maple? The answer to this question is equally disconcerting; in addition to a gradual increase in the proportion of Red maple (a

species with limited potential to produce high-value timber products) in the mature strata, the gap in the regeneration layer is being filled by non-commercial species and American beech. While most non-commercial species will be curtailed as the canopy closes in, beech will continue occupying the gaps in the regenerating layers created as other species die (Figure 3).

In northeastern North America, Beech bark disease has become one of the key drivers of hardwood stand dynamics. Not only has it changed the structure of stands, it has also modified the growth and yield

patterns of hardwood-dominated stands. Due to the complexity of the resulting stand conditions, it is often difficult to make silviculture decisions to improve them. Beech that is affected by the disease complex is of very poor quality, and produces very little high-grade material.

Results from mainstream research initiatives are unanimous: when beech is present in a stand, small-gap harvesting such as single-tree selection (or even no harvesting at all) will certainly lead to beech gradually replacing the overstory. This has important consequences for timber management objectives, as well

as for species diversity. However, our results provide further evidence that this impact could be averted by the application of intensive harvesting regimes with high removals, to limit beech dominance over the more commercially valuable hardwood species. Given the close association between Sugar maple and American beech, management practices must be modified to prevent beech from dominating the canopy, especially on drier sites.

It is undeniable that our climate is changing, bringing higher temperatures, increased drought, more frequent episodes of high winds, and highly variable precipitation. Unfortunately, these effects will exacerbate the decline of Sugar maple. Indeed, beech and Red maple may very well be the species best adapted to these changes. To better understand this situation, an important study has been undertaken by scientists at UNB, the Northern Hardwoods Research Institute (NHRI), and FORUS Research. The goal is to understand the mechanisms that will trigger changes in species distribution, to model the extent of the new ranges, and to recommend adaptation methods through innovative silviculture.

Where beech is not present, or present at very low proportions (less than 20 percent), choosing the appropriate silviculture regimes will promote desirable species while reducing the proportion of less valuable ones. This is achieved by controlling conditions such as light availability, providing shelter to seedlings that are susceptible to sudden exposure, creating germination microsites for new seedlings to establish, and tending young trees of the preferred species. The NHRI silviculture prescription system (SPS) is one of several diagnostic tools that can be used to determine the most suitable treatments. Better silviculture will lead to better productivity and a higher ratio of more valuable trees. We think that it is also compatible with other values and objectives.

ACCEPTABLE GROWING STOCK

Another important aspect of the sustainable production of high-value timber in hardwoods is the notion of quality.

Figure 1. Site requirements for key hardwood species (adapted from Lee Allen, 2013)

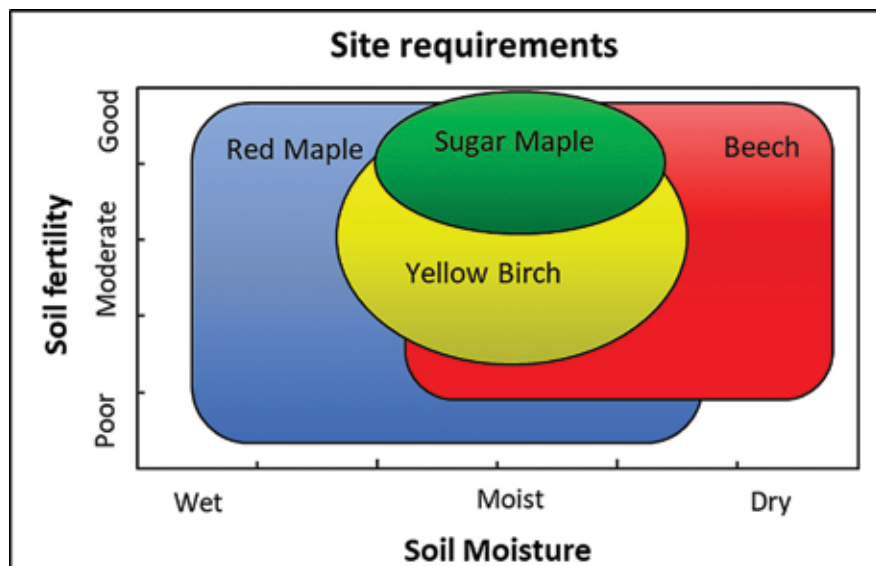
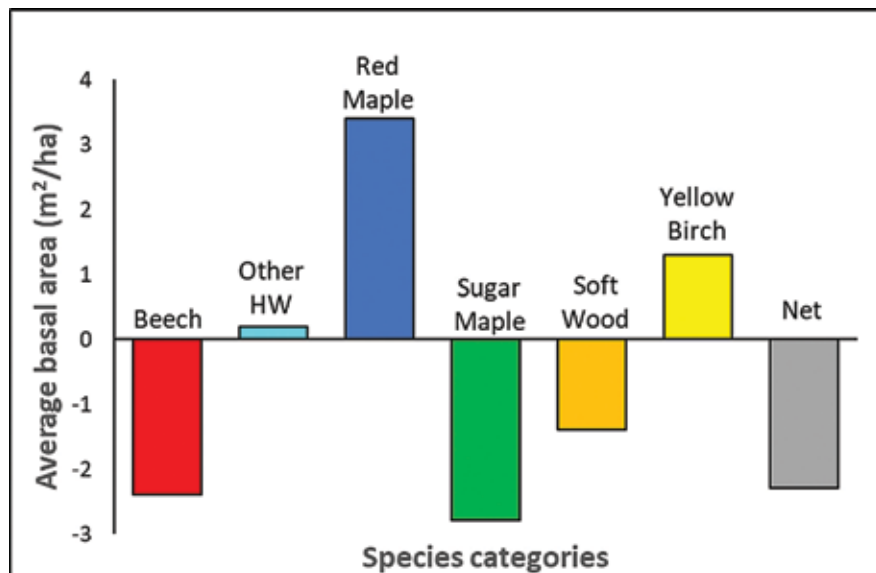


Figure 2. Change in upper canopy species basal area over two inventory cycles for selected areas in New Brunswick. Data shown represents average of data from Ecoregion 5.



Foresters and silviculturists often use the terms “acceptable growing stock” (AGS) or “unacceptable growing stock” (UGS) to describe trees in term of species preference, health status, shape, form, and size. AGS comprises trees of species that have potential for high-grade products, with low risk of losing vigour and value, and of a certain geometry that will produce quality logs now or in the future.

Because of past forestry practices, poor markets for low-grade products, and forest health issues, in our region today it is a rare occurrence to find stands with very high proportions of acceptable growing stock (more than two thirds AGS). When the right silviculture treatments and regimes are used, AGS trees with potential to continue increasing in value are left until subsequent re-entries – while UGS trees containing high-grade products, but at risk of deteriorating, are targeted for harvesting. Poor-quality trees that compete with future crop trees are also removed to achieve the desired density or basal area.

A tree classification system has been created to provide forest managers with objective ways to assess trees and to make silvicultural decisions. The system uses dichotomous keys to assign form (eight classes) and risk of losing vigour and value (four classes). Early adopters of the system in New Brunswick and Maine have found it is also of great value in making more accurate predictions with respect to growth and yield, product distribution, and internal decay (Figure 4).

Minimizing competition against crop trees is the first step towards healthy stands, but land managers must also pay attention to forest health issues such as pests and pathogens, climate-related damage, and browsing pressure from herbivores. The latter issue is not negligible; in some areas, browsing by moose and deer is so extensive that the only recourse is to regulate the distribution of treatments at the landscape level, in order to reduce overall habitat suitability.

INCREASING GROWTH RATES

The last element to consider is the productivity of the stand itself. Annual growth rates (periodic annual increments) in the range of 3-4 m³/ha of gross merchantable

volume, or 0.3-0.5 m²/ha in basal area, can be sustained in our region. High stand productivity is maintained by removing unhealthy and older trees, and reducing competition on crop trees by releasing their crowns on at least two or three sides. It is a delicate exercise in balance, as releasing too much of the crown will, in most species, increase the likelihood of large branches developing.

In the end, sustaining our resource comes down to maintaining and growing an inventory of quality trees of the desired species, and practicing adaptive management. Properly planned and implemented silviculture can greatly reduce the negative impacts and gaps described here. The managed northern hardwood forests should continue to be the focus of partial harvesting in the region. A thorough understand-

ing of the relationships among species, site, environment, and climate – informing a sound silviculture framework – will allow forest managers and landowners to balance timber production objectives with habitat and biodiversity values. This can be challenging, but our experience has shown that forest management regimes to promote species such as Sugar maple and Yellow birch are not incompatible with other objectives.

(Gaetan Pelletier is executive director of the Northern Hardwoods Research Institute Inc., based in Edmundston, N.B. This article is inspired by the work of current and past NHRI employees – in particular, Sharad Kumar Baral, Gabriel Danyagri, Pamela Hurley-Poitras, Stéphanie LeBel-Landry, and Monique Girouard.)

Figure 3. Average change in sapling (5-9cm) density between 1997 and 2013.

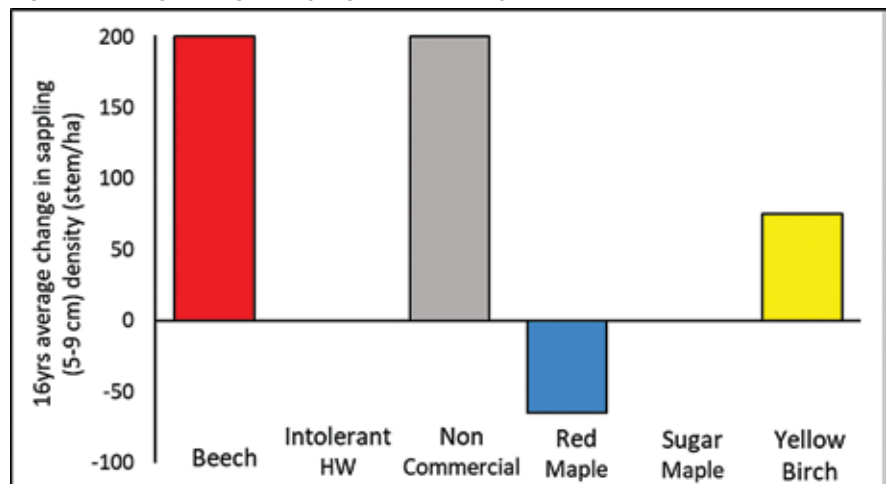
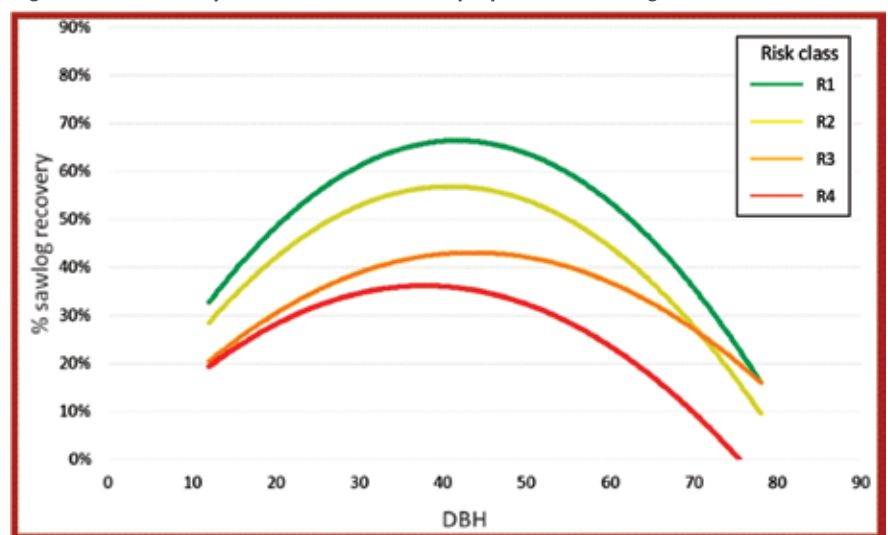


Figure 4. Relationship between risk class and proportion of sawlogs.



Budworm backs off, for now

Infestation levels reduced in N.B.,
spraying expected to be scaled back accordingly

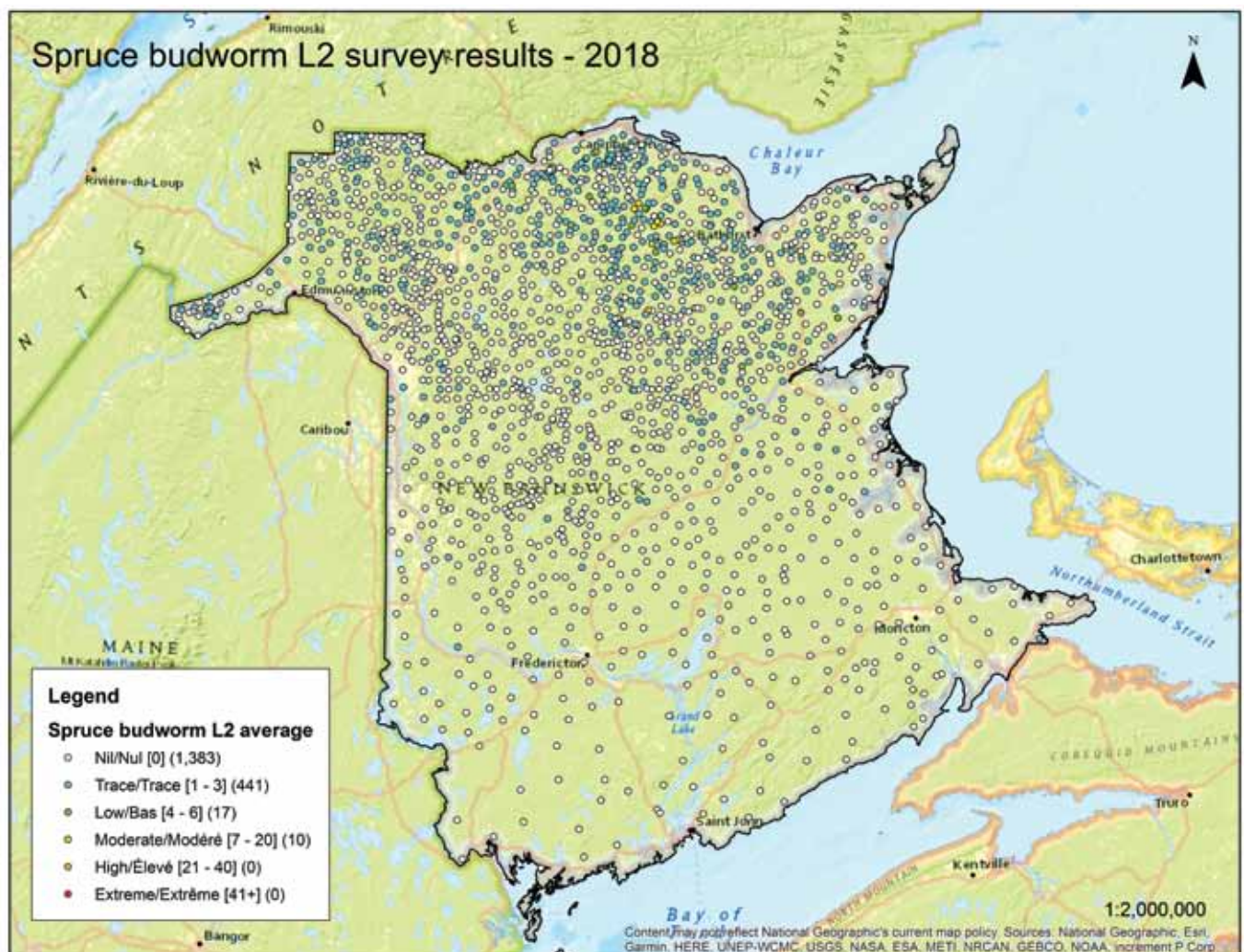
The Spruce budworm infestation in New Brunswick is far from over, but it subsided dramatically in 2018, likely alleviating anxiety for timber interests. Drew Carleton, manager of forest health with the provincial Department of Energy and Resource Development (ERD), says the recent survey results represent a “reset” to budworm levels comparable to 2015 and 2016.

“This is encouraging,” he remarks, “as it provides another year of low stress on the forests of New Brunswick.”

Carleton says the 2018 survey revealed only 10 sample

locations with population densities above the threshold for spraying under the Early Intervention Strategy. By comparison, in 2017 about 120 sample sites were above that threshold, dictating a treatment area of about 200,000 hectares in 2018. In response to the new survey data, the 2019 spray program is expected to be scaled back, but specific plans likely will not be made public until later this winter.

The sampling involves cutting branches from the mid-crown of mature Balsam fir trees, bagging them, and



shipping them to Canadian Forest Service laboratories in Fredericton. The branches are washed in a solution to remove the second-stage (L2) larvae from their webbing, and then the larvae are captured on filter paper and counted under a microscope. The L2 counts provide researchers and forest managers with a picture of Spruce budworm population density.

The number of sites sampled in the survey varies from year to year. Additional sampling is done around population “hot spots,” in order to delineate the area of severe infestation. Between 1,600 and 2,000 sites have been sampled each year since 2014. Because the population is currently higher in northern New Brunswick, approximately two thirds of the samples are collected in that part of the province. The ERD Forest Pest Management Group collects about half of the samples, and the remainder are collected by regional ERD staff and forest industry staff.

The spray program targets areas with high densities of budworm, where forest cover comprises spruce or Balsam fir exceeding a specified threshold. Watercourse buffers, non-forested areas, and Maple sugar operations are avoided, as are steep slopes, windmills, and habitations. The treatment maps are very fragmented, but advanced technologies on the spray aircraft allow for accurate application. Four spray products were used in 2018: Bioprotec and Foray, which are *Btk* formulations; and Limit and Mimic, which contain tebufenozide.

Researchers believe the treatments have helped to set back the infestation. “It is likely that other factors such as natural enemies and possibly environmental stressors contributed to the area-wide decline,” says Carleton. “Budworm populations ebb and flow over the course of an outbreak cycle, and with populations still very much elevated in Quebec, it will be some time before we can breathe easy.” GF

Entomological honour

Dr. Rob Johns, a forest insect ecologist with the Canadian Forest Service in Fredericton, N.B., was presented with the prestigious C. Gordon Hewitt Award at a recent international entomology conference in Vancouver. Dr. Johns earned his PhD at the University of New Brunswick, and did two years of post-doctoral work in northern Japan. In recent years he has been a key player in the Spruce Budworm Early Intervention Strategy, and his team is also responsible for the Budworm Tracker project, a citizen science program for monitoring budworm moths in northeastern North America.



The award is given annually by the Entomological Society of Canada, to recognize an early-career entomologist who has done outstanding work in the field. It is named for Charles Gordon Hewitt, who was appointed Canada’s “dominion entomologist” in 1909. Hewitt expanded national entomology services, and also made major contributions to conservation biology before his death in 1920 at the age of 35. (CFS photo)

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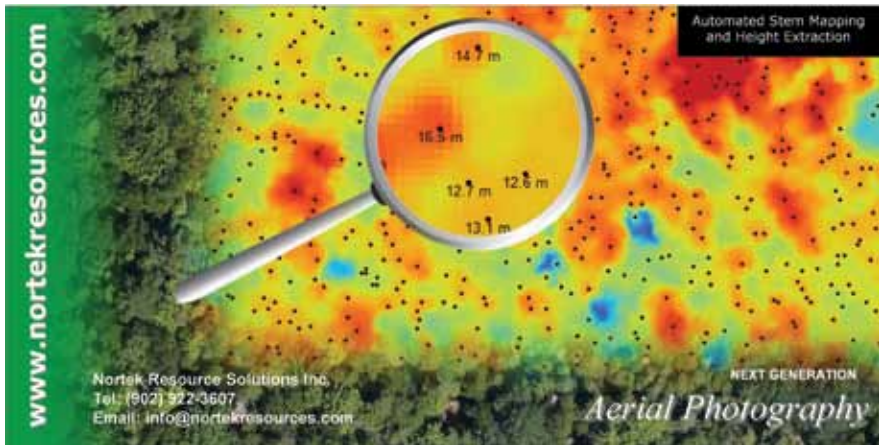
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NEW PRODUCTS AND INDUSTRY NEWS

Cloud control

Remsoft reaches new heights with integrated forest management app



Responding to growing client demand, and drawing on its expertise in planning, scheduling, and advanced analytics, Remsoft has launched a new cloud-based operational management solution for forestry companies.

The Fredericton, N.B.-based company provides optimized planning and scheduling solutions for forestry, helping companies enhance business and environmental sustainability by assisting with data and decision-making on asset acquisition, management, maintenance, and sales.

Designed for managing harvests, deliveries, wood flow, and finances, the new Remsoft Operations app offers planning and scheduling capabilities and real-time analytics to help companies make evidence-supported decisions at daily, weekly, monthly, or annual intervals.

Operational planning and scheduling can often be chaotic and frustrating. "There are thousands of decision variables for forestry companies when executing harvest and delivery," says Doug Jones, the company's senior vice president of solutions and innovation. "We saw the need to apply Remsoft's decades of experience to solve these planning problems."

Using Remsoft Operations, forestry companies can better schedule and manage operations, track progress, and revise plans – ensuring that targets are met, regardless of how quickly they change. Alternative options and scenarios can be evaluated, and decisions modified appropriately.

The app can help companies track and adjust to market demand, maximize the size and capabilities of crews, manage deliveries, and meet mill targets. The product's integration with Remsoft's optimization technology, Esri's Web GIS platform, and business intelligence capability facilitates instant collaboration among teams, and simplifies reporting and information sharing. Remsoft Operations is accessible via desktop, laptop, or tablet. www.remsoft.com/remsoft-operations.

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*Earle Fawcett, Mobile Equipment Manager,
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"[Strongco] really **goes the extra mile** for you. They brought us to visit two mills in the Bathurst area...and the maintenance people told

me [their SENNEBOGENs] are trouble-free machines and that **the parts are easy to source**. I'd seen enough. That helped us make our decision to purchase."

"The operators are very happy with the 830," he laughed. "It's like they **stepped off a dinosaur and into a Cadillac!**"

"Depending on the time of year, this yard is a dust bowl or a mud pit! The trailer-pulling capability of the 830 allows more ready stock for the sawmill, **without increasing truck traffic.**"

Hemlocks in crisis

Agencies mobilize in defence
of iconic forest species

by Zack Metcalfe

The Eastern hemlock is a force of nature in Nova Scotia, by virtue of its age. Loggers past and present have passed it over in favour of more valuable species, allowing hemlocks to become the oldest trees in the forest, accounting for almost all of the province's remaining old growth.

While several plants and animals depend on these hemlocks because of their maturity, others rely on their expansive canopies, which have the effect of shielding streams and understory growth from punishing sunlight, providing habitat for creatures such as Brook trout and deer. They also protect the ground from an excess of snow, creating wildlife walkways even in the harshest of winters.

"Hemlock forests really mediate climate, and create these cool oases in the forest," says Matthew Smith, park ecologist at Kejimikujik National Park.



The hemlocks in Kejimikujik National Park are a major draw for visitors, but that could change in the years to come. (Parks Canada photo)

The importance of these trees to the ecology of eastern North America is difficult to overstate – especially now that they're dying by the millions.

The Hemlock woolly adelgid (HWA) is an aphid-like insect native to the forests of Asia, where it extracts water and nutrients from species of Asian hemlock evolved to handle this regular theft. Thousands of years ago, it's believed, HWA was also introduced to the Pacific northwest, where it feeds on Western hemlocks and is held in check by predatory insects adapted to devour it. In eastern North America, however, no such ecological balance has been struck. The insect is a lethal parasite to the Eastern hemlock, which it drains to death in four to 10 years.

UNCHALLENGED SPREAD

When HWA was introduced to Virginia in the 1950s, it began an unchallenged spread north and east, thoroughly infesting New England and attempting two separate invasions of southern Ontario in 2011 and 2013, both of which were turned back by the careful application of pesticides. In mid-July of 2017, HWA was discovered in the forests of Weymouth, N.S. Since that initial finding, surveys by the Canada Food Inspection Agency (CFIA) have uncovered widespread infestation in Digby, Yarmouth, and Shelburne counties, with smaller pockets in Queens and Annapolis.

"All detections have continued to be in those five counties in southern Nova Scotia," says Ron Neville, a biologist with the CFIA.

Surveys undertaken by his and other agencies looked closely at the hemlocks of New Brunswick, Prince Edward



Eastern hemlock decline visible from the air near Springhaven, in Yarmouth County, N.S. (Justin Smith photo)

Island, Quebec, and Ontario throughout 2018, but no additional signs of HWA were found. In southern Nova Scotia, however, its destructive influence is already being seen. Along the Sissiboo River of Digby County and in the Tuskent region of Yarmouth, hemlocks are dying.

In order to contain this infestation, CFIA has enacted a series of movement restrictions in the five southern counties, covering hemlock logs, bark chips, wood mulch, nursery stock, even decorative wreathes. All firewood, regardless of species, is likewise restricted from leaving these counties. Products may only break quarantine with CFIA authorization, under approved risk-mitigation measures.

“The restrictions are in place to prevent the long-distance spread of HWA by people,” says Neville. “Having the pest move more slowly gives us time to develop more effective management strategies.”

INSECTICIDES

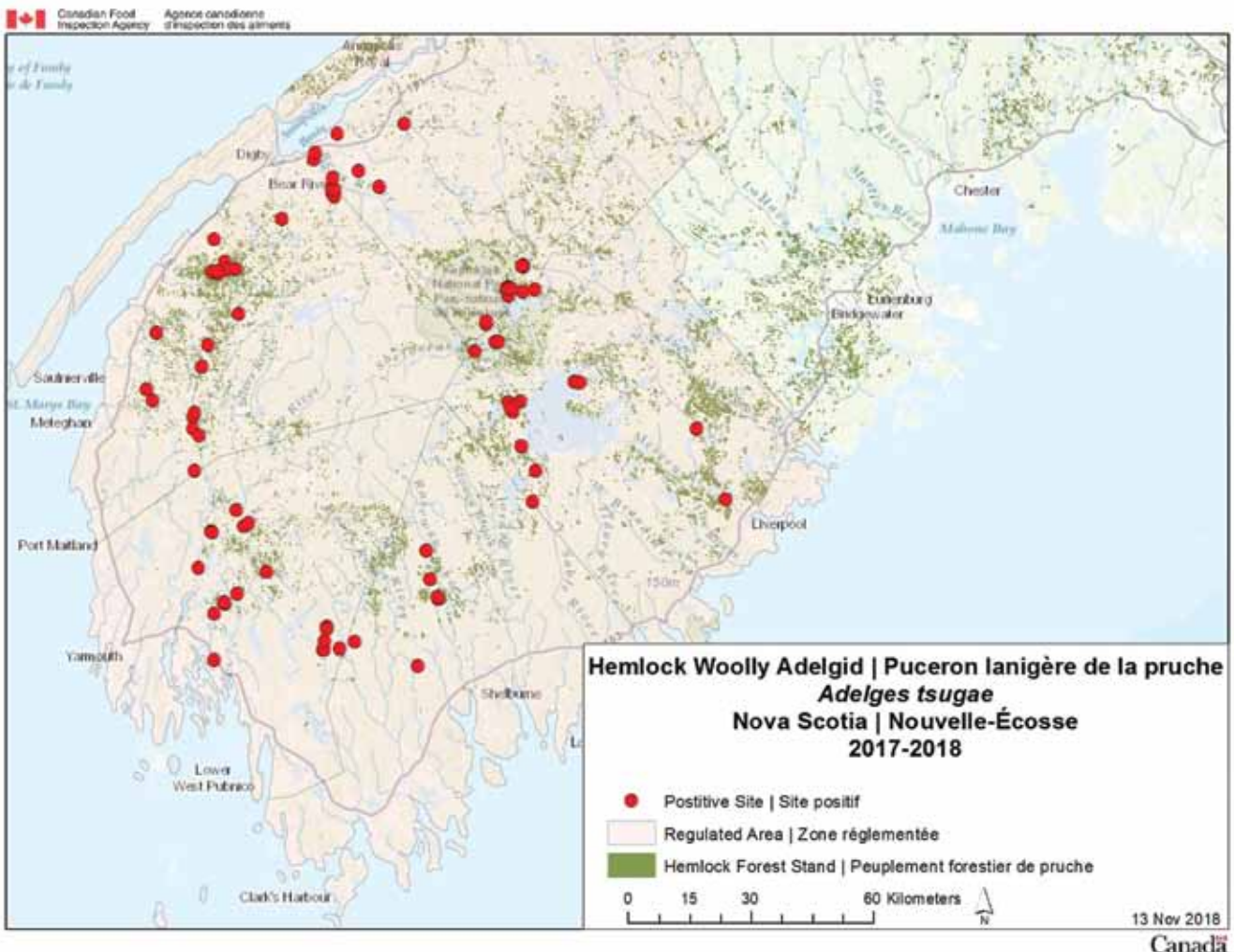
At the moment, there are no pesticides registered and available in Canada for use against HWA, depriving

woodlot owners, private nurseries, and conservation organizations of an important tool for the preservation of hemlock stands. Jon Sweeney, a research scientist with the Canadian Forest Service, is among those trying to remedy this problem. “Right now there are no options,” he says.

Arborjet, a Massachusetts-based company, has applied to have one of its products, IMA-Jet, with the active ingredient imidacloprid, registered for use on HWA in Canada. The pesticide has already proven effective, and Sweeney expects it could be approved as early as spring.

Until then, he and his colleagues have partnered with another company, BioForest, to test its product against HWA-infested hemlocks on a private nursery in Meteghan, N.S. This insecticide, branded as TreeAzin, has the active ingredient azadirachtin. It has a gentler environmental impact than most, says Sweeney, and is already registered for use in Canada against the Emerald ash borer. It was injected into several large hemlocks this October, and the results will be gathered come March.

Sweeney expects both of these products will be more expensive than the combination of imidacloprid and





White egg sacs at the base of hemlock needles indicate infestation with Hemlock woolly adelgid. (Ron Neville photo)

dinotefuran insecticides used to treat hemlocks in New York state. This combination protects the trees from HWA for five years, and is relatively cheap, but is unlikely to receive approval from Canada's Pest Management Regulatory Agency. Given the cost of IMA-Jet and TreeAzin, landscape-scale treatment may be unaffordable in Nova Scotia, and efforts will have to focus on small hemlock stands until there is a long-term solution to the province's HWA problem.

The solution on hand in the eastern United States is the introduction of western insects that prey exclusively upon HWA, namely the beetle known as Little Larry (*Laricobius nigrinus*) and a species of Silver fly (*Leucopis argenticollis*), both slowly establishing themselves in selected states. Predatory insects from Canada's west coast are being considered for possible introduction to Nova Scotia, and evaluated for safety and effectiveness. If suitable candidate species are identified, they could be used as a biocontrol which may, in time, keep the HWA in check.

"We still feel that biological pest control for HWA is really where management needs to move," says Neville. "There has been some work done in Nova Scotia to prepare for that type of initiative."

FIREWOOD

The Medway Community Forest Co-op (MCFC), which currently manages 15,000 hectares of Crown woodland in Annapolis County, is one industry player that has been subject to the wood movement restrictions.

"There have been some added logistics to moving firewood, particularly as a large portion of our public clients reside in Lunenburg County," says Mary Jane Rodgers, MCFC executive director. "During the high season, when HWA is most active, we are required to cover our firewood

that comes from hemlock sites, or if it is stored in our yard for a duration of 15 days before it is sold outside the restricted zone. Another step we take is tracking firewood through the CFIA movement certificates, to ensure that our deliveries are well monitored if an outbreak were to occur elsewhere. So far these haven't been too much of an inconvenience. CFIA is a very responsive organization and has been very helpful throughout the process."

Rodgers says the co-op is considering a move to kiln-dried firewood, as a new revenue stream. Kiln-drying firewood is a common precaution against the spread of insects. It is a requirement at a number of Canadian and American national parks, and one

adopted by Kejimikujik in January of 2018, meaning MCFC could no longer be a supplier.

HWA was discovered in Keji in August of 2018, and since then the insect has been found at 10 sites throughout the park, each relatively isolated thus far. Under the park's new policy, visitors can only bring firewood if it is kiln-dried and in its original packaging, and the firewood for sale at the gate is – for now – kiln-dried wood from a company called Fiready in New Brunswick.

"It's about slowing the infestation," says Matthew Smith, "but it's also about other invasive species, namely the nearby Emerald ash borer and Beech leaf weevil."

Smith is acutely aware of what's at stake. "In Nova Scotia, Keji and the neighbouring Tobeatic Wilderness Area certainly have some of the best examples of old-growth hemlock forest, and some of the largest," he says, noting that some of the trees are 350-400 years of age. "You walk through it and really feel what it was like in Nova Scotia prior to the harvesting of a lot of our old-growth stands."

Smith and other Keji staff are bracing themselves for the ecological impacts of HWA. Their trees have not yet started to die, which suggests the infestation is newer than those farther south. They're not sure how quickly the decline will occur, but they are well positioned to monitor the process.

Keji's facilities are surrounded by towering hemlocks which may begin to fall, and their famous hemlock trails are a draw for visitors. Consequently, the park may take a financial hit. In the meantime, Smith is encouraging people to come and admire these outstanding trees that face an uncertain future.

(Zack Metcalfe is a freelance journalist, columnist, and author active across the Maritimes.)



WOMEN IN THE WOODS

This past August the Mersey Tobeatic Research Institute (MTRI) presented its fifth annual Women in Forestry Workshop, held in Concession, Digby County, N.S. Organizers

and attendees expressed gratitude to host woodlot owner and forester Mary Guptil; fellow presenters Jillian Weldon Genge from the Department of Lands and Forestry, and Patricia Amero from the Western Woodlot Services Co-op; and contractor Brian Thomas, who gave a demonstration of partial-cut harvesting and shared his experiences of forest management.



The workshop was “a breath of fresh air,” said Shelagh Wright, a participant who works as a flight paramedic. “I met an amazing cohort of women with a wealth of experience. I then came out of the woods with a better and much more positive view of forest harvesting, to the point I may change careers!”

In response to positive feedback from attendees, MTRI is working on plans for another workshop this spring. Watch for further information in *AFR*, or inquire by email to jane.barker@merseytobeatic.ca.

(Jane Barker photos) 

In uncertain times

N.B. woodlot owners take stock, as politicians grasp for credibility

by George Fullerton

The New Brunswick Federation of Woodlot Owners' 2018 AGM, held Oct. 25, was popular with politicians, attracting three provincial party leaders, as well as the acting minister of Energy and Resource Development.

The provincial election in September had produced no clear winner, with the Progressive Conservative party holding one more seat than the Liberals, but with the Liberal government remaining in power, as allowed under parliamentary rules. The balance of legislative power was divided between the Green and People's Alliance parties, with three seats each. The Liberals' hold on power would last only until the throne speech and a non-confidence vote on Nov. 1, which moved the PCs into power, landing Blaine Higgs in the premier's seat.

This outcome was still uncertain when Higgs addressed the AGM, reiterating the PC promise to review the Crown Lands and Forests Act. He stated that Crown lands should not be in competition with wood from private woodlots, and that proportional supply should remain in the Act. In response to a question from the audience, Higgs agreed that Crown land management should be a profit centre for the province.

David Coon, leader of the provincial Green Party, said the election marked a change in the way New Brunswickers want to see politics done. He pointed out that rural ridings sent a strong message from their ballot boxes, asserting that it was "time for the Liberal government to fish or cut bait." He also reviewed how Frank McKenna's Liberal government gutted woodlot owners' primary-source-of-supply rights, with devastating results in the ensuing decades. Coon called for the reinstatement of these rights, as the Greens had proposed in their campaign platform.

Chris Austin, leader of the People's Alliance party, said the election results showed that government must do "what is best for New Brunswickers, not just what is best for industry." (The People's Alliance's platform had attracted some attention in forestry circles because it called for banning glyphosate spraying in New Brunswick.)

Roger Melanson, then acting minister of Energy and Resource Development, was the luncheon speaker, reviewing the significance of forestry to the provincial economy, and highlights from the Liberal election platform.

COMMUNICATIONS

Susannah Banks, the Federation's executive director, thanked the marketing boards for their support through the year, and highlighted communications efforts, which included updating the group's website, posting blog entries, and building a social media presence. Other files Banks dealt with included climate change and carbon markets, Spruce budworm, and participating as a director with the



David Coon, leader of the provincial Green Party, addressed the New Brunswick Federation of Woodlot Owners' 2018 AGM, repeating his call for the reinstatement of primary source of supply. (George Fullerton photos)

New Brunswick Community Land Trust. She also engaged with some 42 other organizations calling for reform to the Crown Lands and Forests Act, including wildlife and environmental groups, as well as representatives from academia.

Federation President Rick Doucett extended his gratitude to Banks and to board managers, crediting the Federation's communications strategy for the fact that private wood marketing and Crown lands management had become serious election issues. Doucett was re-elected as president of the Federation.

BOARD REPORTS

Shawn McGrath, general manager of the YSC Forest Products Marketing Board, reported that four new directors were recently elected, to make a full slate of 11. He said while they have spent a good deal of time studying carbon markets and the potential opportunities for woodlot owners, the specific rules around carbon sequestration are still up in the air. McGrath said finding markets for low-grade

wood continues to be a priority, and proposed biomass heating projects show some promise in this regard.

Neil Silliker has served several terms as a director with SENB, and accepted the position of board manager just a few weeks before addressing the Federation AGM. He said wood sales started out slow in 2018, and have remained behind the previous year's volumes. Silliker confirmed that SENB's entire silviculture budget had been allocated. Another major achievement for the organization was the introduction of direct deposit service for clients.

Linda Bell, manager with Carleton-Victoria, reported that sales were down by 20 percent in 2018, and more softwood logs have been going to U.S. mills. Bell welcomed Lisa Barkley, C-V's new silviculture manager.

The report from the SNB was presented by Chris Spencer, who had recently been hired as manager. He said SNB has continued to struggle to access markets, but their silviculture program was on schedule, and he expected they would spend their entire budget. Spencer highlighted the need for an updated wood supply analysis, to accurately determine woodlot owners' annual allowable cut. He said there has been little progress getting clarification from the Department of Environment on the requirements for buffer strips and culvert sizing under new provincial watercourse regulations. Spencer concluded by thanking everyone who supported SNB's GoFundMe campaign to support their recent court cases.

Northumberland manager Paula Crever said their sales were down by 20 percent compared to 2017. Their major markets include Arbec, Fornebu, and JDI. They did see a small price increase on softwood in the autumn. Crever said they had spent their entire silviculture budget.

Diane Landry, the newly installed manager for Madawaska, began her report by recognizing Dick Bellefleur's 35 years of service and commitment to woodlot owners during his tenure as manager. Landry went on to report their



Progressive Conservative leader Blaine Higgs – not yet premier at the time – also addressed the meeting, reiterating the PC promise to review the Crown Lands and Forests Act.

wood sales were down by 34 percent in 2018, and she emphasized the board's commitment to developing markets and supporting woodlot management work. In the past year, board headquarters was moved into a new office building in the Edmundston Industrial Park and equipped with new computers and software that will handle GIS and LIDAR more efficiently. Landry said the silviculture program was going well, with technicians helping woodlot owners complete management work on some 2,500 acres this season.

Patrick Doucet, manager with North Shore, reported that their wood sales were down by 42 percent in 2018. In a follow-up interview, he pointed out that when softwood pulp is selling at only \$40/tonne, "no one wants to cut wood and leave the low-grade

products in the woods." He said board representatives have been pressuring government to take steps toward supporting a market for low-grade wood, and a possible scenario would be co-firing biomass with natural gas once the Belledune power plant stops burning coal.

Doucet said North Shore's silviculture season typically continues until around Christmas, but winter conditions in November necessitated shutting down prematurely.

Peter deMarsh, president of the Canadian Federation of Woodlot Owners, provided a national perspective, reviewing the group's efforts on federal taxation, climate change and carbon, rural economic development, softwood lumber trade issues, and community forests.

Getting up to date on wood tech

UNB symposium offers a glimpse of manufacturing and building trends

by George Fullerton

The University of New Brunswick's Wood Science and Technology Centre marked its 30th anniversary by hosting a symposium on Nov. 5, with an impressive lineup of speakers. As it turned out, a major windstorm two days prior to the event left 94,000 electricity customers across the province without service, and also shut down the Fredericton airport, resulting in aborted travel plans for several scheduled presenters. However, the speakers who could not get there made their presentations by telephone, with an assistant flipping through their PowerPoint images, ensuring a broad range of topics and perspectives on developments and trends in wood manufacturing.

Dr. Meng Gong, director of the Wood Science and Technology Centre (WSTC), began by providing some historical background, from the organization's establishment as the Tweeddale Centre in 1988, with a focus on wood engineering, polymers, wood science, and forest roads. In 2008 the WSTC established the Canadian BioEnergy Centre. Currently the WSTC's mandate includes wood product development and research, product testing, technology transfer, modified wood construction



Dr. Meng Gong (left), director of the University of New Brunswick's Wood Science and Technology Centre, chats with a participant at the symposium on Nov. 5.

(George Fullerton photos)

systems, wood component connection systems, engineered wood products, and heat treating.

Jacqueline Girouard, an engineer who is president of Girouard Consulting, talked about the importance of innovation in wood processing, in order to compete in global markets. She outlined

how her business interacts at both the administrative and shop-floor levels to help companies move toward automation technologies that will improve efficiency and profitability. She discussed potential impediments to accepting and integrating new technologies, and strategies for motivating managers and workers to embrace the transition.

Jonathan Pastrokos, with Business Development Canada, focused on seven trends that are currently transforming manufacturing: data, robotics, internet machine communications, cloud data storage, simulation, augmented reality, and 3D printing. He said these technologies have the potential to foster product development, increase product value, expand export opportunities, and improve planning. As an example of how digital technology can enhance customers' experience of products or services, he cited the use of software that helps homeowners design a new kitchen.

Data, Pastrokos explained, is improving our ability to reach the right people at the right time – to reach specific types of customers when they are close to making a purchase. He said with real-time data,



Dr. Mohammad Mohammad, a senior research advisor with Natural Resources Canada, offered perspectives on the economic and environmental merits of mass timber construction for medium-rise buildings.

management decision-making is advanced from the reactive to the predictive.

Augmented reality (or “virtual reality”) is gaining popularity for training purposes, Pastrikos said, citing the example of operating and repairing robotics in the manufacturing sector. With respect to 3D printing, he said the ability to build prototypes more quickly is a significant advantage. He concluded by urging businesses to adopt long-term strategies for the adoption of new technologies, and to build employee teams to champion the necessary adaptations in the workplace.

TOMORROW’S SAWMILL

Darrell Wong, with FPInnovations, provided a summary of sawmill trends, including scan and set, batch processing, and grade production technologies. He emphasized that in order to maintain competitiveness, mills need to drop unit costs.

Wong said processing speeds will be increased through the adoption of more and better sensors, and the cost of this technology will come down as its use expands. He expects the industry will move toward a single-scan system, where data collected at infeed will follow a log right through the entire mill process. He also foresees a greater role for “intelligent machines” that have the capacity to self-adjust, which will be increasingly important as a means of achieving the higher tolerances required for lumber used in prefab building panels.

Wong also predicted that “dashboarding” – the real-time display of key metrics and data points – will allow sawmill

managers to respond immediately to market indicators, shifting production to better meet demand. He cautioned that one of the big challenges in the lumber sector will be finding and retaining skilled employees to operate and maintain high-tech equipment. He said he anticipates virtual reality will play a larger role in training workers and technicians, in forest harvesting as well as manufacturing.

PANELIZATION

Dr. Ying Hei Chui, a professor in the Faculty of Engineering at the University of Alberta – and a former director of the WSTC – delivered a presentation on the increased use of panelization in the construction industry. He said this technology is becoming more common in low-rise buildings because the panels can be built very efficiently in a factory, then trucked to the construction site “just in time” for assembly. Factory production, he pointed out, means a safer work environment, less material waste, more mechanization, no productivity losses due to weather, and lower overall costs.

For mid-rise and high-rise construction, floor and ceiling panels present a challenge, because 12’ x 50’ is the maximum size for transport to the building site. Chui said there is a need to develop panel connection systems that will ensure lateral stability, and there is also demand for advanced assembly systems to sling and lift panels.

Roof systems present a unique challenge, Chui noted, because truss components, once assembled, are bulky and inefficient to store and transport. He said the University of Alberta has devoted considerable research efforts toward engineering new roof systems that incorporate stud panels in the attic to support roof panels.

MULTI-STORY BUILDINGS

Dr. Mohammad Mohammad, a senior research advisor with Natural Resources Canada (also formerly with the WSTC), offered his own perspective on this sector, stating that research and construction projects around the world have demonstrated that, in medium-rise buildings, wood can do what steel and concrete can do, but with a smaller environmental impact and at lower cost.

He cited the 18-storey Brock Commons Tallwood House at the University of British Columbia, and the 13-storey Origine residential building in Quebec City. Both projects utilize cross-laminated mass timber and other engineered wood products.

For many years, wood buildings were limited to four storeys, but in 2009 British Columbia’s building code approved five- and six-storey construction, and by 2015 a number of other provinces had followed suit. Mohammad said wood has proven economical for buildings of this size, in addition to meeting “green” construction criteria.

Mass laminated timber (MLT), using either nail or dowel connectors, has been proven safe and effective for high-rise construction, Mohammad said. Concealed steel connectors, which offer high fire performance, have helped provide the push for MLT and panel construction in taller buildings. Mohammad noted that the 2017 federal budget included \$40 million for the development of wood high-rise demonstration projects – a clear sign of optimism for this sector.



Dr. Ying Hei Chui, a professor in the Faculty of Engineering at the University of Alberta, delivered a presentation on the increased use of wood panelization in the construction industry.

SPIKED TO

Nail-laminated timber – a good way to



A temporary workshop set up at Elmsdale Lumber for manufacturing nail-laminated timber (NLT) panels to be used in the new East Hants Aquatic Centre.

Green construction advocates get pretty excited about high-tech engineered wood products like cross-laminated timber (CLT), but at this point such products are specialty materials that are hard to spec into a project, due to the absence of local expertise and production capacity. There is, however, another approach to mass timber construction that can be adopted much more easily. Nail-laminated timber (NLT) has actually been around forever – or at least since mass-produced nails and lumber became readily available – and with the recent push toward wood construction as a means of carbon sequestration, it is regaining favour.

One example is the new East Hants Aquatic Centre, a \$19 million project currently under construction in Elmsdale, N.S., led by Bird Construction. Patrick Crabbe, brand development manager

with the company, says nearby Elmsdale Lumber provided warehouse space as a temporary shop where NLT panels were manufactured this winter by workers with Celtic Construction, which is a division of Bird. About 85,000 board feet of the mill's premium lumber was used in the panels.

No glue is used in the process; lumber is simply stacked in a jig and fastened with nails, at spacings that depend on the span of the panel. "There are many engineering factors. It also depends on the thickness, and the length of the nail you're using. In this case, we're using 2"x4" 12-foot, just your standard Number 2 and better, like for house construction, and we're nailing at 8-inch intervals," says Crabbe.

"This is a product that has been around for the last century, and it exists in some public infrastructure throughout all of

Atlantic Canada. It has just recently had a resurgence now that wood is kind of at the forefront of construction, and it's now being integrated as a prescriptive solution, and to code, and being realized as a carbon benefit."

NLT panels may be used in roof, floor, or wall applications. For the Aquatic Centre, they will be used in the roof over the 25-metre pool. "They will span in between steel purlins, so it acts as a structural member, but also has the architectural finish," says Crabbe, noting that the panels will not be treated with paint or finish of any kind.

"Wood is perfect in a high-humidity environment, to a certain extent," he says. "It can't really exceed about 80 percent relative humidity, but other than that – it doesn't condense like steel does with changes in temperature. You know,

TOGETHER

to incorporate wood in public buildings



Swimming Pool Aquatic Centre, a \$19 million project being built just down the road by Bird Construction.

(Patrick Crabbe photos)

when you have condensation on steel and you have water pooling, then you have corrosion, and you could even have contamination in the pool if the drops are dripping into the pool itself. So it works really well above arenas as well, because that's another area where you could have temperature fluctuations, and a lot of the time those droplets will drop on the ice and create little bumps, and that can make it difficult for players."

Crabbe was formerly employed with Atlantic WoodWORKS!, a program of the Maritime Lumber Bureau aimed at expanding the use of regionally produced wood products in non-residential and multi-family construction. In that capacity, he had addressed the Municipality of East Hants a few years ago, talking up NLT as one way of using locally-produced sustainable building materials. Municipal

staff were receptive, and Crabbe ended up being involved in bringing the idea to fruition.

"We're just really happy to see it in this high-profile project, to hopefully influence government in more public projects in the future, as well as private ones," he says. "I think it's important to really pound home the point that in our public buildings, in government buildings, local products should be favoured. This is a perfect type of system for over a school gym, or the atrium of a school. It really does suit that well, because it does not require massive setup or capital costs, and it's a cost-effective solution too. So it would be great to see the provinces really take a look at this seriously, because they're the biggest client, and until they really start specifying stuff in buildings, it's going to continue to be an uphill battle." DL



Spiking together 12-foot 2"x4" lumber creates a solid panel which will span between steel purlins in the roof structure above the pool. About 85,000 board feet of the mill's premium lumber was used in the panels.

Doing better

A frequent host for field days and tours, Kevin Veinotte tries to lead by example

Kevin Veinotte and his family, of West Northfield, N.S., are repeat winners of Nova Scotia's Woodland Owner of the Year Award, having first received the honour in 2007.

A few things have changed since then. Those three little kids he and Susan were raising are now young men. Their business, Out to Pasture Farm, has continued to diversify, and now includes a poultry processing plant as well as grass-fed Belted Galloway beef, Katahdin sheep, free-range chicken, Christmas trees, and some 470 acres of forest.

Veinotte grew up on the property, which partly comprises the original land that has been in the family since 1860. As a child he was initiated into forestry in much the same way as his ancestors—helping his dad snig out logs with an old workhorse. Later, he picked up some formal training through forestry studies at the Lunenburg County campus of the Nova Scotia Community College. After his father died, around the turn of the century, he took stock of his role as a landowner, and fully devoted himself to the task.



The Veinotte family – (from left) Kevin, Luke, Mark, Susan, and Neil – with Chester-St. Margaret's MLA Hugh MacKay (at right), accepting the Nova Scotia Woodland Owner of the Year Award. (Amy Weston photo)

Through Wade Turner, who runs the J.A. Turner & Sons Ltd. sawmill just down the road, Veinotte was introduced to local forestry consultants Patricia Amero and Sandy Hyde, and ended up having them

write his management plan. He became an early adopter of FSC (Forest Stewardship Council) certification, and embraced an approach to harvesting guided by natural processes, with an emphasis on species and age-class diversity, and uncompromised protection for soil, watercourses, and wildlife habitat.

LEAP OF FAITH

For a long time, Veinotte took a hands-on role in the woods, with all treatments conducted by manual felling and extraction by horse or tractor. But a couple of years ago he came to the conclusion that he couldn't keep up with the selection management work he wanted to get done.

"As we get older and get a little bit busier, we've got a lot less time," he says. "And I haven't, for years and years and years, been able to reach my AAC (annual allowable cut). And that's one of the goals – to move some more wood – and I've got quite a bit of mature and over-mature wood on some of those blocks, so it just made sense to get somebody in who could take care of it and tidy it up and do a good job."



Ryan Veinot, of Isenor's Forestry, at the controls of the Timberjack 1270D – a machine that wouldn't have been seen on this woodlot a few years ago. (Eric Lindsay photos)



Sam Reeves, watershed and agricultural projects coordinator with Bluenose Coastal Action Foundation, demonstrating the installation of in-stream habitat restoration structures in Silver Mill Brook, which passes through the Veinotte farm and woodlot.

Allowing heavy forestry equipment onto the woodlot was something of a leap of faith, but Veinotte built a trusting relation with Kevin Eisnor, a contractor in nearby Blockhouse, N.S., and he has been pleased with the results. In close consultation with this very cautious landowner, and taking care to avoid operating during wet conditions, Eisnor conducted a series of patch cuts, some single-tree selection harvesting,



Provincial conservation officers were on hand to demonstrate the use of aerial drones.



Amy Weston, manager of the Nova Scotia Salmon Association’s NSLC Adopt-a-Stream program, checking out the brook with Kevin Veinotte, whom she describes as a committed and enthusiastic partner in conservation projects.

and a partial overstory removal. The latter treatment, on a site where previous thinning had fostered excellent natural regen, involved 80 percent removal, taking mature spruce while leaving tall hemlocks and White pines. The spruce, about 130 years old, were exhibiting reduced crown growth.

Veinotte says Turner was “very happy” to receive the large-diameter wood. “That’s what he does really well at. His mill is kind of old-school, and they do better sawing those big logs than they do sawing little pecker poles. He’s got customers that demand a bigger, higher-quality stick than what some other mills are dealing with or want to bother with – some long-term customers. So it works out well. It works out for all of us.”

The harvests added up to a considerable volume. “Just this last one we did was a 100-tonne cut, and before that I think it was 500 or 600 tonnes that they cut. They removed quite a bit. It’s efficient to do it, the way we were cutting in there. But we’ve had some thinnings that he’s done, and I’ve been really happy with the thinnings too.”

He says he fully intends to have Eisnor’s crew return to do more work. “We may not be doing as big a volume as we had on that first smash or two that we had done, but they’re quite happy to come in and do a couple of weeks’ work at a time. Of course they can’t come in and work for two days and leave. By the time you

float the equipment, you’ve got to have a little more volume and time. But they seem quite happy to work with us.”

PUBLIC ENGAGEMENT

Part of what Veinotte finds satisfying about his vocation is engaging with fellow members of the farm and forestry communities, and with the general public. That includes loyal customers at local farmers’ markets, and families who may get a sleigh ride through the woodlot when they come to choose a Christmas tree from his 20-acre lot.

He has worked with Ducks Unlimited to establish ponds on his property, and has taken voluntary steps to reduce the ecological impact of his agricultural practices, earning a Nova Scotia Farm Environmental Stewardship Award in 2014. For the past 10 years he has worked with the Nova Scotia Salmon Association’s NSLC Adopt-a-Stream program, including efforts such as fencing livestock out of watercourses, planting trees in riparian areas, and installing in-stream structures to restore natural flow patterns in Silver Mill Brook.

“Kevin has brought unfailing enthusiasm to these projects, and he sees it as part of his stewardship role as a farmer. He recognizes the value of the stream running through his property,” says Amy Weston, program manager with Adopt-a-Stream, who was an exhibitor at the Sept. 29 field day to celebrate the 2018

Woodland Owner of the Year award. “Not only has he taken a number of steps toward remediation, he has fol-

lowed best management practices, such as not harvesting close to the brook, and building good crossings. He really takes

an interest in the biodiversity on his land, and he enjoys the public education side, hosting field tours and showing people what we’re doing there.”

Iain Rankin, the provincial minister of Lands and Forestry, issued a statement congratulating Veinotte for “pushing the forestry industry forward with innovative and sustainable practices,” and for “demonstrating exemplary practices in woodland management.”

Playing that kind of role means giving up some of your privacy, and giving a lot of your time, but Veinotte believes strongly in leading by example. “I’d like to see us, as private woodlot owners, do a better job on management, both on harvesting and in keeping diversity – doing small openings and thinnings, as compared to once every 60 or 70 years flattening everything and starting from scratch,” he says. “I just like to see a bit of wood cut over a greater period of time. It spreads your tax implications, it’s better for the woodlot, it’s better for the environment. I think it’s just generally better.” DL



Roger Zinck was on hand generating some lumber with his Wood-Mizer LT40 portable bandsaw mill.



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“The trees are our lifeblood on this planet”

Retirees see Cape Breton forest property as an investment in the future

Bill Oprel and Ruthe Macaulay were tickled to receive the 2018 Woodland Owner of the Year Award for the eastern region of Nova Scotia, because they are big believers in forest extension. For the first time in a long time, the provincial Department of Lands and Forestry only held a field day for the overall provincial winner, not the regional winners – but Oprel and Macaulay hope that the government’s response to the Lahey Report will include more resources for outreach work, so they can make their woodlot available for public education programming in the future.

In 2000 the couple took early retirement from their careers in the Waterloo area of Ontario, and moved to Cape Breton. They made their home in Little Narrows, in Victoria County, but they were also interested in owning some forest. “Ruthe always wanted a reasonably sized piece of land. I think she had about 75 acres in mind,” says Oprel. “We loved bush-whacking, and we would go around and look at properties that were for sale.”

The piece they ended up buying in 2011 was somewhat larger – a 200-acre parcel near Glencoe Mills, Inverness County, about a 30-minute drive away. They worked with the Nova Scotia Landowners and Forest Fibre Producers Association to get a management plan done, and proceeded with some treatments.

“There were areas of Acadian forest regen after a cutover probably about 20 years before we found it. It had a lot of young stuff growing, and it was so thick you had to squeeze between the trees to get through it, so a lot of PCT (pre-commercial thinning) was done on a large portion of it,” Oprel says. “It’s been awesome to see what has happened since that was done.”

North Inverness Forest Management Limited also played a key role



Ruthe Macaulay and Bill Oprel accept their award as Woodland Owners of the Year for Eastern Nova Scotia, accompanied by Simon Mutabazi, an extension forester with the Department of Lands and Forestry. (Contributed photo)

in completing silviculture. Other efforts included cutting some trails, installing gates, and marking boundary lines. Along the way, the couple attended forestry conferences and workshops, and used the provincial woodlot management home-study manuals to increase their knowledge.

“We’ve had a steep learning curve, but it’s been good,” says Oprel. “Our thought process was to promote the growth of the forest. It had been Acadian forest, and that’s what wanted to grow.”

About three years ago they bulldozed the derelict homestead on the property, and built a cabin on the site, so they could comfortably overnight at the woodlot. Around the same time, they purchased an adjacent 130-acre parcel, and they are now in the process of flagging trails and planning treatments on this land, which has some nice stands of mixed timber.

Their objective is to restore the natural resilience and diversity of the forest, while protecting ecological attributes such as wildlife habitat and carbon sequestration. “We’re not allergic to taking product out, but keeping in mind that we want the forest to continually be there,” Oprel says. “The trees are our lifeblood on this planet.”

The couple, both now in their 70s, recognize that they were fortunate to be financially able to buy this land for their retirement project, and they see it as a gift to future generations.

“We have family, and older grandkids. One of them just turned 20, and she learned how to run a spacing saw and a few other things that we were doing, so there’s an interest there,” says Oprel. “We’re hoping that something falls into place in the next few years, and eventually they can inherit this.”

N.S. WOODLAND OWNER OF THE YEAR CENTRAL

“One of the special places on earth”

U.K. resident cherishes stewardship of family woodlot in Nova Scotia

by Jennifer Gouchie

Jaime Snell-Pollendine lives in the U.K., but she describes her relationship with the woods as a real Canadian love story. As a child, she spent a lot of time at the family woodlot in Nova Scotia’s Wentworth Valley. She and her parents often travelled there from their Halifax-area home on weekends. She has especially fond memories of winter visits – snowshoeing through the snow-covered woods and cutting down a Christmas tree to take home.

“It was one of the special places on earth for our family,” says an emotional Snell-Pollendine, bursting with pride to have been named the 2018 Woodland Owner of the Year for Central Nova Scotia.

Her father, William Snell, bought this land in different parcels, starting in 1966. As he acquired additional acreage over the years, he began to spend more time experimenting with small patch cuts and a variety of different plantings, including non-native species like Douglas fir, Austrian pine, and Sitka spruce, to name a few. Now comprising 202 hectares, the woodlot has been managed for the past 10 years by North Nova Forest Owners Co-operative Ltd., which hosted a field day on the property on Sept. 23 to celebrate the award.

SPECIES MIX

Greg Watson, manager with North Nova, describes the woodlot as an outstanding example of careful, long-term

management. He says most, if not all, of Nova Scotia’s native Acadian Forest species can be found on the land, but it is heavily dominated by hemlock, with smaller patches of pure hardwood, and good Red spruce regeneration on harvest blocks. “We’ll try to keep a mix of both in the future,” he says.

Low-impact forestry has always been the approach. In the early years, that meant manual felling, and using horses and tractors to extract the wood. More recently, mechanized harvesting has been conducted under the guidance of North Nova. “But we’ve recently done some horse logging in conjunction with the harvesters in small, sensitive areas, to release new growth,” adds Watson.

A network of hauling trails has been



Jaime Snell-Pollendine, the 2018 Woodland Owner of the Year for Central Nova Scotia, accepts her award during a celebratory field day in September, flanked by Greg Watson (left), manager with North Nova Forest Owners Co-operative Ltd., and Don Cameron, from the provincial Department of Lands and Forestry. (Jennifer Gouchie photos)

established to facilitate treatments, and access roads have been upgraded with support from the provincial funding program administered by Forest Nova Scotia.

Watson says the property borders a few kilometres of the Wallace River, with quite a bit of flood plain forest, and some evidence of past agricultural use. The woodlot is used by many local people, who come to pick fiddleheads or to collect brush for wreaths, and North Nova uses the land as a venue for educational field tours. A wide range of age classes are represented, with some stands in the regeneration stage, while other sections are 60-70 or 70-140 years old – with some scattered trees that are more than 200 years old.

Watson describes the soil as “tremendous,” and says it should remain that way as long as it’s managed properly through partial harvesting. “Its glacial till deposits are super productive, but with the wrong practices, that could change,” he warns. “If managed properly, the economics will be there for a long time.”

A FATHER’S LEGACY

Snell-Pollendine has lived in the U.K. for the more than 25 years, but returns to the Wentworth Valley with her family a couple of times each year. A garden designer by trade, she says she’s interested in “all things horticulture,” and this fits in well with her management of the property. But the real reason she has maintained her involvement with the woodlot is to honour her father. A few years before his death in 2013, he wrote a letter to his family describing his love for the property and expressing his desire for the tradition of managing the woodlot to continue after he was gone. Snell-Pollendine is certain he would have been proud of her efforts, and the award they earned.

“I was always with my father. We were nature-mates together,” she says. “I adored my father. We did everything together.”

North Nova’s management style meshed well with Snell-Pollendine’s objectives, which include protecting the aesthetic and ecological aspects of the woodlot that have always been of



A PTO-driven firewood processor being demonstrated during the Sept. 23 field day.

paramount importance to the family. “I rely on their advice, and trust them to help manage the woodlot in my absence,” she says.

She is opposed to clearcutting in most circumstances, and has chosen partial-harvest treatments. This is consistent with her father’s thinking, but she doesn’t do everything the same way he did. For example, her father liked to keep the woodlot neat and tidy, whereas Snell-Pollendine prefers to leave woody debris to rot. “It’s better for the environment than cleaning it up,” she says. “Our practices have changed with further information and knowledge.”

Her biggest challenge is managing the woodlot from more than 3,000 miles away, but North Nova is helping her bridge that gap. A 20-year plan is now in the works, and she intends to become more involved as she has more free time, especially experimenting with plants. The geographical distance has in no way diminished her attachment to the property, or her sense of personal responsibility as a landowner.

“We have to be so mindful of taking care of what we have. We’re doing our best to take care of it for the future,” she says. “I want people to learn about what we’re doing here. I’m excited about the future and sharing it with others, and I’m thrilled about the educational tours North Nova holds here.”

(Jennifer Gouchie is a freelance journalist in the Greater Moncton area. Her journalism career dates back to the mid-1980s when she joined the editorial staff of her family-owned newspaper business Cumberland Publishing Ltd. in Amherst, N.S.)



Jaime Snell-Pollendine is a believer in low-impact forestry, which includes the use of horse logging in some particularly sensitive areas.

A dynamic father-and-son team

The Kirkpatricks have earned a reputation for smart and sensitive harvesting



Father-and-son team Robert and Eric Kirkpatrick were honoured as the recipients of this year's Ken Hardie Stewardship Award, given by the YSC Forest Products Marketing Board. (George Fullerton photos)

At the 2018 AGM of the York-Sunbury-Charlotte (YSC) Forest Products Marketing Board, Robert and Eric Kirkpatrick were honoured as the recipients of this year's Ken Hardie Stewardship Award.

The father-and-son team farm together, manage their woodlots, and conduct silviculture and harvesting treatments for other landowners in the YSC and SNB marketing board regions. Their home base is in Wirral, N.B., and they own 420 acres just inside SNB's jurisdiction. Both Robert and Eric have served as directors on the SNB board.

Robert's great-grandfather Kirkpatrick came to the Hoyt area in 1830, had a large family, and established a

farm and a significant wood harvesting operation. Robert grew up working that land, and also worked for the Department of Transportation for 26 years.

Eric, like his father, was introduced to farming and forestry at an early age. Out of high school, in 1999, he found work with a harvest contractor in Nova Scotia, and gained experience on chippers and forwarders.

In 2003, father and son formed Centennial Farm and Forest Ltd., and the next year they had a management plan prepared for their woodlands, and continued with harvesting and silviculture in a more directed fashion – relying on manual felling, a tractor and winch, and a Massey Ferguson forwarder.

They also have a dirt construction kit consisting of a tandem dump truck and a Kubota excavator, allowing them to do jobs such as driveway construction and basement backfills. With this equipment, and their operating expertise, they have maintained good access throughout their woodlots. A shale pit on their property produces excellent material for the construction of durable roads that are passable by loaded tractor-trailers.

SELECTION HARVESTING

In addition to PCT treatments, the Kirkpatricks have undertaken commercial thinning and release cuts in mature stands, and have done some selection harvesting aimed at retain-

ing a healthy mix of wind-firm species that have potential to develop into high-quality timber. Their crop tree selection focuses on tolerant species in the Acadian forest catalogue.

The work requires a clear understanding of silvics, soils, and drainage regimes, as well as the technical skill to maintain even spacing across the treated area, without damaging crop trees. The Kirkpatricks have built a business doing similar work for other woodlot owners, and their client list has grown along with their reputation for conducting sensitive harvesting.

Woodlot owners choose to go this route because they are banking on high-value logs eventually being harvested, but doing the work in a cost-effective manner is a challenge for contractors. Eric points out that while a good number of stands qualify for modest funding to conduct “operational semi-commercial thinning” under New Brunswick’s silviculture program, tolerant stands that qualify for a higher level of support are very few and far between.

One of the innovations the Kirkpatricks have brought to their harvesting is the use of a log grapple mounted on their Kubota mini-excavator. The grapple was initially employed to assist with bucking and loading firewood, but with a few modifications it has become a tool to help move felled and limbed trees to roadside. Initially, the stems were forwarded by tractor and winch to the log yard. In the past year, a forestry trailer has been added to the kit, so now the excavator is used to move harvested stems to trailside – “hoe chucking” – where they are bucked, and then forwarded to the truck road with the new trailer. This system is more efficient and safer, and the wood stays cleaner, which means less time is spent sharpening chains.

Ken Hardie, who died in 2016, was utterly devoted to New Brunswick forests, and he worked tirelessly on behalf of woodlot owners in the province. He would have been proud to see Robert and Eric Kirkpatrick recognized with the award named in his honour. GF



A thinned hardwood stand on Kirkpatrick woodlands – the kind of treatment that has earned them a good reputation with other woodlot owners who want high-quality treatments done.



Chris Spencer (left), manager of the SNB Forest Products Marketing Board, shares a laugh with Alan Beardsworth, during an Oct. 14 field day on Beardsworth's winning woodlot in Goshen, N.B. (George Fullerton photos)

The splendours of the forest

Retirement project combines relaxation and silviculture work

Alan and Bonnie Beardsworth, the SNB Woodlot Owners of the Year for 2018, hosted a celebratory field day and tour on Oct. 14, welcoming about 50 visitors to their property in Goshen, in the northwest corner of Albert County, near the village of Elgin, N.B. Brilliant weather provided a perfect opportunity to enjoy the hardwood forest in its autumn splendour.

The Beardsworths, who have been retired for several years, live in Riverview, but they have a cottage on the Pollett River near Elgin. "I always thought I would like to own a woodlot," says Alan, noting that he attended a forest management course about 20 years ago, and intended to put that knowledge to

work when he found the right piece of land. Eventually the opportunity arose, and they purchased the 100-acre parcel in 2006.

"It is very convenient for us to come to the woodlot to work and enjoy it," he says.

They refer to the property as the Marion Woodlot, in honour of Alan's mother. "She loved nature and gardening, and that deep interest in nature and growing things was passed on to me," he explains.

Like much of Albert County, this land varies widely in elevation. The main access trail extends up a pretty steep incline, and soon tips downhill again – but the trails are neatly graded

and mowed, providing a great walking experience.

The management history of the property, under previous ownership, included a major harvest in the late 1970s. The Beardsworths have conducted pre-commercial thinning on some 27 acres of naturally regenerated cutover, and they have had about 26 acres planted, in separate blocks of White spruce, Red spruce, and Red pine.

ARBORETUM

While on a holiday in Scotland, the couple enjoyed a visit to an arboretum that featured a great number of native and exotic tree species, and they were inspired. In 2008 they acted on their

dream, and began collecting and planting seedlings on a well-drained slope near the front entrance to the woodlot.

It soon became evident that the success of the project would depend upon fencing out deer – as is the case in Scotland, where fenced cutover areas are a common sight in the countryside, as part of an ambitious national program to establish more native hardwoods. The Beardsworths' arboretum covers about two acres, and currently hosts 32 tree species.

With considerable activity committed to developing and caring for the arboretum, as well as other forestry work, the couple built an equipment shed on the property in 2010, using wood sourced from the land and sawn on-site with a portable bandsaw mill.

They hire their neighbour Joe Steeves to help out with harvesting, and also with building and maintaining trails throughout the woodlot. The trails are generally smooth and dry – adequate for travel by pickup truck, allowing access for recreation as well as woods work.

In 2014, the bandsaw mill was again employed to produce lumber to construct a cabin within the arboretum fence, making it possible for the Beardsworths and their friends to enjoy the woodlot anytime, in any kind of weather.

The pre-commercially thinned stands are now well stocked with high-quality tolerant hardwoods, along with a scattering of intolerant hardwoods and coniferous species. As often occurs following this type of treatment, there was considerable hardwood suckering, creating a visual curtain under the crop-tree canopy. Because he enjoys the aesthetic value of a more open stand – for example, to view wildlife – Alan has undertaken a good deal of “thinning from below,” to remove this growth.

The Beardsworths invest a lot of energy in their woodlot, and reap a great deal of enjoyment, along with their supply of winter fuelwood. GF



Alan Beardsworth has done some understory cleaning on previously pre-commercially thinned stands, to control the growth of suckers beneath the crop trees.

From dairy farm to productive timberland

Jean-Roch Long returned to the old home place to grow trees



Jean-Roch Long (left), the Madawaska Forest Products Marketing Board Woodlot Owner of the Year, with board technician Jean-Yves Caron (centre), and Dick Bellefleur, the board's manager. (George Fullerton photo)

Jean-Roch Long, the Madawaska Forest Products Marketing Board's Woodlot Owner of the Year for 2018, lives on a woodland property that was formerly his family's farm. His house overlooks Cairn Lake, near the village of Lac Baker on New Brunswick's Madawaska panhandle.

Along the woodlot road, Long can point to various stands and cutover areas that he recalls were once fields of grain and hay. Large rock piles are evident throughout the property – a testament to generations of farmers who cleared and farmed the land. Long notes that many of those rock piles became a source of base material for roadbuilding and for rip-rapping culverts.

The family once operated a dairy farm here, but in 1967, when their market for milk was shut down, they sold the herd and moved to Hartford, Connecticut. Long finished high school there, and in 1977 he met a girl named JoAnn, whose family also had roots in Madawaska. With a twinkle in his eye, he recalls asking her if she thought she might get married and move back home. She replied that this sounded like a pretty good idea, and they returned to the old farm in 1978 as husband and wife.

"I bought the 200-acre woodlot with a handshake from my father," says Long.

FORSTRY CAREER

After studying forestry at the University of Maine at Fort Kent, and also attending the Maritime Forest Ranger School in Fredericton, N.B., Long began working for Fraser Inc. in 1978. He started out as a pre-commercial thinning foreman, but his career with the company also included supervising planting, scarification, and mechanical harvesting.

On his own land, one of the first steps he took was to establish a truck road, which currently extends more than two miles, reaching the entire length of the woodlot. "A good road is important to be able to harvest and transport, and also to plant and do thinning," he says. "A road is also important in case of forest fire. When the road was constructed, I made sure there was a very good base that would stand up to heavy hauling."

Long later purchased an adjacent property, so the woodlot now comprises about 500 acres. In recent years he has harvested much of the land, following up with planting White spruce.

“When I first planted, we put in Black spruce,” he says, “but I was not happy with the way they grew, so I changed to White spruce, and they are doing very well.”

Dick Bellefleur, manager of the Madawaska Board, says this species is very well adapted to the local climate and soils. “When I began working with landowners, our seedling sources provided a lot of Black spruce, but I thought White spruce would be a better choice. Eventually we convinced nurseries to produce White spruce for us, and it has proved to be a good species.

“Over the years, we have planted a lot of old fields and cutovers with White spruce, and now there is a good deal of commercial thinning going on, to allow those stands to develop further. When you plant White spruce further south toward Saint-Léonard, they do not grow as well as on the panhandle.”

SITE PREP

In the year following a harvest, Long would contract scarification, then plant the following year, with chemical competition control in the year after that.

“I prefer the powered disc trencher for scarification,” he says. “It provides limited opening to the mineral soil, so that there is minimal moisture evaporation. I think the seedlings do best when the land is prepared by the powered disc trencher.”

At some point in the future, Long expects to carry out

mechanical cleaning in some of the plantations. In addition to these very productive young plantations, he has about 20 acres that have been commercially thinned. The treatment was done with a mechanical harvester, and the operator clearly did a good job, with trees evenly spaced and very little scarring of crop trees along the extraction trails.

There has also been some 90 acres of pre-commercial thinning on areas with advanced natural regeneration. In one of the treated stands, certain trees have been marked with paint around breast height. “I have been butt-pruning the best quality tolerant hardwoods in the thinning. I take care to select the best quality trees, and carefully remove the lower limbs with a pair of sharp snippers,” Long explains.

“I do it in the autumn, without scarring the bark on the stems. There is less chance of the cuts becoming infected at that time of year. My long-term objective is to have those trees produce veneer logs and high-quality saw logs. The paint mark allows me to quickly identify the veneer trees and make sure they are easily identified and anyone working can see them and make sure they are undisturbed.”

For the time being, Long has curtailed harvesting activities, because the mature woods provide a wildlife corridor – a conservation attribute he considers important. Once the plantations grow large enough to provide cover, he will resume harvesting, continuing to realize timber value from the old family farm. GF



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Good land for Sugar maple

Silviculture success in tolerant hardwoods on the Acadian Peninsula

Gaetan Boudreau was introduced to the woods as a child, helping his father cut timber on the family farm in Tracadie-Sheila, on New Brunswick's Acadian Peninsula. This early experience provided him with the basics of forestry work, and also fostered his interest in hunting.

Following high school, Boudreau studied pipefitting, and began working in the trade. He has since become a certified tradesman in both pipefitting and ironwork, and has travelled across the country to work on major construction projects. Ten years ago he purchased his woodlot at Hacheyville, near the village of Saint-Isidore, not far from where he grew up. His management efforts on

this land have brought him great personal satisfaction, and have earned him special recognition as the North Shore Forest Products Marketing Board's 2018 Woodlot Owner of the Year.

Boudreau has completed more than 40 acres of semi-commercial thinning in stands dominated by Sugar maple. The crop trees, averaging six to eight inches in diameter (dbh), are evenly spaced in the treated stands, and appear healthy and vibrant.

"I did a lot of the cutting myself, and I hired a guy with a farm tractor and forestry trailer to haul out the wood," says Boudreau. "Mostly I produced fuelwood, and had it forwarded to the

wood yard, where a 10-wheel log truck picked it up for delivery."

Boudreau accesses the 100-acre woodlot from a power line corridor, with a main truck road that continues to about the middle of the property. Spotting wildlife is one of the perks of doing his own woods work.

"I see a lot of moose and sign of moose on my woodlot. Mostly I see cows with calves, and some young bulls," he says. "Only very occasionally do I see a bull with a big rack."

Discovering a bear den along the main haul road was another exciting moment. "I noticed that some dirt had been disturbed, so I had a closer look, and I could see that the excavation sort of curved around after the entrance," he recalls. "I did not bother to look around the corner!"

Patrick Doucet, manager with North Shore, says the marketing board is proud of Boudreau's silvicultural accomplishments. It helps, he points out, that this land has favourable attributes for growing good Sugar maple.

"It is a combination of soil qualities and climate that provides the conditions for high-quality tolerant hardwoods," says Doucet. "Outside that immediate area, our hardwood component is more often intolerant, with White birch and aspen dominating."

He adds that Boudreau's success in achieving good stocking of young tolerant hardwood is also partly attributable to the management history of the woodlot. The previous owner did selection harvesting and small patch cuts – treatments that leave some shade on the ground, which promotes the establishment of tolerant species.

ICE STORM

In 2017 the Acadian peninsula was hit by a significant ice storm, which layered ice on trees and power lines across the region. Boudreau says the weight of the ice caused his thinned trees to bend over, but they recovered



A fine winter day on Gaetan Boudreau's woodlot at Hacheyville, not far from where he grew up on New Brunswick's Acadian Peninsula. Boudreau has done a lot of his own thinning treatments on the land. (George Fullerton photos)



Gaetan Boudreau was named the North Shore Forest Products Marketing Board's 2018 Woodlot Owner of the Year.

after the weather warmed up.

"The Sugar maple did the best; they had the fewest limbs broken," he says. "The Yellow birch and the beech suffered the worst. Some of the Yellow birch have pretty well all the limbs broken. I don't like seeing those damaged trees, so I will go through the thinning and cut down those severely damaged trees."

Doucet says the provincial silviculture program provides a good incentive for thinning treatments like those conducted on Boudreau's land, but it's hard to meet demand.

"We could do a whole lot more if there was a contractor who specialized in that type of work. Most woodlot owners in our board have full-time jobs, and they do not have time," he says.

"We are currently looking at one contractor who is considering buying a machine specifically designed for commercial thinning. We know there are lots of woodlot owners who would like to have work similar to what Gaetan has done." GF

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Happy New Year!

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Land of cork and eucalyptus

Portuguese forest economy includes artisanal products, and large paper mills

by David Palmer

Portugal's forests, which cover 40 percent of the country, are composed primarily of three main species groups: the pines, the oaks, and eucalyptus. The pines – primarily Maritime (*Pinus pinaster*) and Stone pine (*Pinus pinea*) – provide lumber, resin, and pine nuts; the oaks – Cork oak (*Quercus suber*) and Holms oak (*Quercus ilex*) – supply fuelwood, acorns, and cork products; and the eucalyptus (*Eucalyptus globulus*) feed the pulp and paper industry. A handful of other species – including Sweet chestnut (*Castanea sativa*), Strawberry tree (*Arbutus unedo*), narrow ash (*Fraxinus angustifolia*), and Carob tree (*Ceratonia siliqua*) – make up the balance, while graceful plane trees (*Platanus acerifolia*), with their surreal splotched bark, line many city streets.

Although Portugal has a thriving lumber export business, mostly from Maritime pine, you'd be hard pressed to find a wood frame structure there. We travelled the length and breadth of the country, but spotted no sawmills, encountered no log trucks on the highways, and saw only one building under construction with wood (and it seemed like a trial project). Even the old wooden doors and windows are being replaced with new composite products. A seemingly endless supply of stone and concrete comprise the building materials of choice.

On the other hand, evidence of the cork industry is everywhere. Screw caps and synthetic stoppers may be commonplace in the rest of the world, but you won't encounter a bottle of wine anywhere in Portugal that isn't stoppered with genuine cork. The Portuguese are doing all they can to keep cork alive. It almost seems like a patriotic mission. To begin with, wine is so cheap, so good, and so readily available, it's a sin not to pick up a few bottles with your grocery staples. It's also served generously three times a day – with lunch and supper for sure, and also for a light, snacky meal that falls conveniently between lunch



Joao Silva removing the bark from pieces of Cork oak before splitting them for firewood. This species holds an elevated position in Portuguese culture, and cork is used for a myriad of products besides wine bottle stoppers. (David Palmer photos)

and the late-evening repast that rarely starts before eight.

GREEN LEATHER

Portugal produces 50 percent of the world's cork, and though wine corks represent 15 percent of usage by weight, they haul in 66 percent of total cork revenues. But the prodigious national effort to sustain the cork wine stopper trade is not enough; there is considerable innovation in construction, decor, fashion, and the craft industry – churning

out cork floors, insulation, trivets, purses, hats, cricket ball cores, shoes, boots, and more. Cork wears like leather, becoming softer with time, and it is elastic, compressible, and waterproof.

A clever marketing campaign pitches cork as “green leather,” because it is derived from a renewable resource. The Cork oak grows all over the country, but is most common in the south, in the Alentejo region. The bark is cut from living trees by skilled workers, in a labour-intensive operation conducted

every 9 to 12 years. The year of harvest is recorded on the bare trunk, so the tree can be given sufficient time to



A Cork oak (*Quercus suber*) before the bark is harvested . . .



. . . and afterwards, with paint markings on the tree trunk to keep track of when it can be harvested again, generally 9-12 years later.

regenerate its bark.

While non-timber management of Cork oak is the norm (and the approach advocated by the government), the species sometimes appears in wood piles. At a small village with the fetching name of Maria Vinaigre (Vinegar Mary), we found young Joao (John) Silva hard at work splitting wood for his cork bark and firewood business. Although his father (also Joao) owns a woodlot, Joao Jr. is too busy to harvest it himself, so he buys wood from local producers. The bark, which is worth more than the firewood, is carefully separated from the inner wood during splitting. The longer, straighter, more valuable sections are removed prior to splitting, to be sold to buyers in Germany, who pay a premium for the choice lengths and render them into high-price items like boots, aprons, and even yoga mats.

The oak firewood fetches 45 euros per cubic metre, or 100 euros per tonne. That's roughly equivalent to \$150/tonne, or about \$300/cord. Oak is the choice for home heating, but bakeries prefer acacia, so Joao keeps a supply of that on hand as well. He also stocks eucalyptus rails which are used as support timbers for greenhouses.

THE HOLLY OAK

Another common oak is Holms oak, also known as evergreen or Holly

oak – so named because the leaves of lower branches are prickly like holly, to discourage browsers, though the leaves of the upper limbs are round-lobed like other white oaks. The acorns are a favourite food of the free-range Iberian black pig, reportedly a cross between a pig brought to the peninsula by the Phoenicians and the native wild boar. Each animal requires a hectare of mixed-oak “pasture” to fatten up. According to pork aficionados – and among the Portuguese there are many – the acorns impart a nutty flavour that is unsurpassed. Large legs of Iberian ham hang conspicuously in every restaurant wherever good meat is served. One evening, in the northeastern regional centre of Bragança, we drank to the oak as we chowed down on a delicious wild boar pie in a courtyard restaurant called Javila.

ON AN OPEN FIRE

Another treasured native tree that yields a food crop is the Sweet chestnut. Their nuts are sold by street hawkers who roast them on braziers in Lisbon and Porto. This delicacy is enjoyed particularly during the *Todos os Santos* (All Saints' Day) holiday that falls on November 1. In the tiny village of Picote, in the Trás-os-Montes (literally “back of the mountains”) region, we actually roasted chestnuts on an open fire. They have a good taste, but are a bit on the dry



Tasty nuts from Sweet chestnut (*Castanea sativa*), roasted at home over a fire . . .



. . . or purchased from a street vendor in the historic city of Porto.



New growth on a landscape scorched by the terrible 2017 forest fires, which killed 63 people in Portugal.



Salvage harvest of burned eucalyptus. This non-native tree feeds the country's pulp and paper industry.



A roadside pile of eucalyptus. The tree comprises about 25 percent of the Portuguese forest, and is managed by short-rotation coppice harvesting.

side. Added to a stir fry, marinated in olive oil with a dash of salt, or wrapped in a slice of good Canadian bacon, they would be dynamite. The chestnut wood is sometimes used for furniture, and for restoration work. In the enchanting 400-year-old schist villages of the Serra Da Lousa, we saw oak beams sheathed with live-edge chestnut boards supporting the traditional red tile roof.

LOVED BY FEW

The pulp and paper industry is dominated by The Navigator Company, which has mills at Setubal (just south of Lisbon) and at Figueira da Foz, between Lisbon and Porto. Paper accounts for 4.9 percent of exports, employs 3,000 people, and contributes 3 billion euros to the economy. The coastal plains and hillsides that flank these two mills are cloaked in eucalyptus, an introduced species that has drawn criticism from environmentalists. Some claim that the terrible 2017 forest fires, which took the lives of 63 people, were made worse by the flammable nature of eucalyptus leaves, and by the tree's loose, hanging bark that is propelled airborne by swirling updrafts from a conflagration, landing in the unburned forest and contributing to the spread of the fire. Whatever the case, Portugal's resin-rich native pine forests are also highly flammable, and have adapted over centuries to survive and regenerate in this fire-scarred landscape.

Eucalyptus was brought to Europe from Australia in the late 1700s by Joseph Banks, the botanist explorer who sailed with Cook and Blich and lends his name to our native Jack pine (*Pinus banksiana*). Covering 800,000 hectares, eucalyptus comprises 25 percent of the Portuguese forest, accounting for an annual harvest of 9.45 million cubic metres in 2000. It is managed by short-rotation coppice harvesting (every eight to 10 years), relying on the tree's ability to re-sprout multiple stems, which are thinned down to four or five main trunks. Despite its detractors, eucalyptus is a handsome, stately tree that provides a regular cash crop to thousands of small landowners.

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Views from forestry groups and associations in the Atlantic region



**Breton Forest Innovation
Cooperative**
Middle River, N.S.

After a tremendously colourful autumn in the spectacularly dramatic foothills of the Cabot Trail, it has been on the blustery side here in Middle River, Victoria County, Unama'ki. Everyone seems to be looking forward to spring already, and we are almost back around to the time of year when days get longer – bring back the light!

Here at Breton Forest we have been renovating staff accommodations, assessing our three-phase electrical system, budgeting what we need to spend on infrastructure renewal, taking stock of leftover inventory, planning our kiln renovation to accommodate smaller loads, and looking at how we will divide our space to accommodate forest product-based incubator businesses.

Breton Forest has been contacting local landowners and forest-based creators, while searching out networks to link with more. We are making connections with local silviculturists to hand-select and fell high-value hardwoods – using one crew

with a horse. We have jointly purchased, through an investment strategy, a chipper to begin to clear back access roads to members' woodlots. This week we began purchasing a few live-edge slab boards from a local miller and forest owner to begin our cooperative marketing strategy, slowly, from the ground up.


We are looking at a “community supported agriculture” structure for utilizing fuel logs as we sort the saw-ables from the remainder. This service to our community will provide our members with seasoned firewood a year in advance, and allow folks to invest in a business model that supports smaller-scale forest management, which fits into the matrix branch of the “Triad Model” of forest sustainability.

We wish to continue to meet with anyone who has an interest in supporting our prototype of a collectively-run product chain that supports the health of rural communities and forest ecosystems. This is a unique opportunity here in Middle River, and we hope it grows beyond. What we need next is YOU: forest growers, basket makers, artisans, educators, crafters, silviculturists, architects, precision builders, and volunteers. By working closely together, we can build an incredible system that supports many levels of biota for generations to come.

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**New Brunswick
Federation of
Woodlot Owners
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Happy 2019!

As we enter 2019, it is a time to think about new beginnings and what it is that we as private woodlot owners want. If the government does open the Crown Lands and Forests Act, what do we want included in a new Act? What do we want changed? The N.B. Federation of Woodlot Owners is working to ensure that the voice of private woodlot owners is heard in the preparation of a new Act. It is important that we speak with a collective voice and in a way that offers solutions.

Our unique political situation offers a rare opportunity to potentially affect change. A more diverse legislature means more points of view are being expressed and hopefully heard. We at the Federation will continue to lobby for better access to the market through enforcement of proportional supply,

and a long-term commitment to the private woodlot silviculture program. A long-term silviculture agreement would allow for better planning and increased efficiency.

Our Building Resilience Against Climate Effects (BRACE) project will begin in 2019. This project will provide training opportunities for foresters, forest technicians, and woodlot owners to learn about the impacts of climate change and the best way to manage a forest to make it as resilient as possible. A healthy, resilient forest is better able to withstand the many challenges that will arise, and provides multiple benefits to society at the same time. Trees sequester carbon and produce oxygen. They provide flood mitigation by absorbing and holding water. Forest floors act as filters for water and help to hold soil in place, thereby reducing erosion. Forests also provide habitat for many other plants and animals, and offer us recreational and spiritual opportunities.

In order for a forest to be both healthy and productive, management is required. Good forest management is actually a lot like forest farming, where cultivation of the best trees encourages them to grow to their maximum potential. Weaker or dying trees or species that you do not want (weeds) are removed. Wood can be used as the basis for products that we need, and in many instances can replace fossil fuels as the source of carbon. Trees are renewable and can replace themselves in a human lifetime. Forests have been used for centuries to provide products for human consumption, and can continue to do so if we manage them in a sustainable way.

Marketing boards are uniquely positioned to help woodlot owners manage their woodlots in a sustainable way. The priority for marketing boards is to provide woodlot owners with the best possible advice on the management of their woodlots. They work on behalf of woodlot owners. Marketing boards are run by a board of directors comprising woodlot owners who oversee the policies and direction for the marketing board. Marketing boards can be powerful tools if woodlot owners work together toward a collective goal. There is a reason that

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the saying “together we stand, divided we fall” exists and is often cited. It is true. “Divide and conquer” has been a military strategy for centuries because it works. Now is the time to come together as a collective, if we hope to stand against the global move to increased corporatization. Support your fellow woodlot owners by supporting your local marketing board, or it may be you standing against a corporation on your own.

Susannah Banks
Executive Director, NBFWO
Phone 506-459-2990
Email nbfwo@aibn.com
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North Nova Lumberjacks Society
Truro, N.S.

2019 WOODLAND OWNER OF THE YEAR

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Email: simon.mutabazi@novascotia.ca
- Electronically at novascotia.ca/woodlandaward

Closing Date: April 15, 2019



Season's greetings from the North Nova Lumberjacks Society! It is with sincere gratitude that we thank the 60-plus organizations that supported our society's efforts through 2018, as well as all the athletes, volunteers, and spectators who took part in our events. More than 100 competitors and 3,000-plus spectators attended our events in 2018, making it our most successful year to date. Our society was even recognized this fall in the Nova Scotia House of Assembly by Queens-Shelburne MLA Kim Masland for our efforts in hosting the inaugural Canadian National Axe Throwing Championships in Liverpool this past August. We are very humbled to have been recognized for our contributions to the communities along the South Shore in 2018, and are thankful for the overwhelming support we received from the Municipalities of Queens, Shelburne, Barrington, and Argyle.

We are very excited to announce dates for our 2019 premiere events. The 4th annual Nova Scotia Lumberjack Championships will be hosted July 6-7 in Barrington, N.S., and the 2nd

annual Canadian National Axe Throwing Championships will take place Aug. 24-25 in Liverpool, N.S. We are looking forward to returning to Nova Scotia's beautiful South Shore, which was so incredibly inviting in 2018.

In addition to our two premiere events, some key initiatives that our society will work towards this year will be to add additional axe throwing events under the NNLS banner, as well as offering paid NNLS memberships to competitors for \$20 (\$10 if part of another lumberjack sports organization) in an effort to grow our society and the broader lumberjack sports community.

In other news, our organization held its annual general and business meeting on Nov. 4. Burlin Nickerson has taken over the responsibilities of president and chair of the society, and his wife, Kendra Nickerson, has joined the board and will act as secretary and treasurer. I will continue as a board member and support our new president in my new role as vice-president. Remaining board members include Suzy Atwood, Darren Hudson, Geoff Larkin, and Janet Walker.

If you're interested in learning more about our organization, our events, or how you can get involved in any of our initiatives, please visit our website or send us an email.

Stay sharp folks!

Ryan McIntyre
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**Federation of
 Nova Scotia
 Woodland Owners
 Truro, N.S.**

On the cusp of a New Year, we tend to fall into the wonderment of where we have been and where we are going. We reflect on what has made us proud. We contemplate the times in which we could have helped the skidder a little further port or starboard. Forests grow in a man-

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ner so diverse that one must regularly keep in touch with all the bionetworks – including one’s own. No matter if our ambitions are in growing intensively, solely for conservation, or somewhere in the biodiverse, mixed-matrix of other objectives, we as forest owners are continually working towards improving our forest’s health, while maintaining our economic security. This mixed-value system is often why we invest in land: to have the opportunity to work it, work within it, and continually improve its health. It is a balance not easily achieved in our current market structure, nor most obviously in our current political atmosphere.

The Federation is embarking on our 20th year of working to address pertinent issues on behalf of woodland owners, and we continue to learn. One could say we will never stop learning and evolving. Following the release of the Lahey report, we will be proactive in strategic implementation of ecological forest management under the Triad Management System – from the ground up.

We continue to work collaboratively within the Nova Scotia Association for Woodland Certification (along with the Nova Scotia Landowners and Forest Fibre Producers Association, and the Mersey Tobetic Research Institute) and will continue to reach out to forest

land owners and managers and other potential partners. What we need next is YOU. The more the community of forest growers and forest-product producers work together, the brighter our future becomes ecologically, socially, culturally, and economically.

We are hosting three information sessions across the five central counties: Halifax, Hants, Colchester, Pictou, and Cumberland from February 21-23 to talk about forest certification, land management delivery, our communications campaign #ForestsProvide, the Triad Model of Ecological Forest Management, and the importance of connecting the forest community inclusively under all three branches of sustainability. We welcome landowners small, large, young, old, new, and veteran. There will be something for everyone, and we wish to tap into your experiences, knowledge, and ideas to be as inclusive as possible. If you know of anyone, please invite them.

We currently have been collaborating as a sector to support one another. We have been consulting our landowners and silviculturists to ensure we are not losing any more marketplaces within our province. We will do what it takes to ensure we are supporting local economies and improving our ecosystems. Forests continue to provide for flora, fauna, and folks in a network of

biodiverse production and utilization. We as a forest community need to work together to solve issues that arise, for the betterment for all. This is our pledge to sustainable forest management. The Triad Model encompasses all schools of forest thought. We are here to help you manage yours. Please reach out by phone to Stacie Carroll, executive director, 902-957-2947 or by email at stacie@fnswo.ca. If you would like to talk to one of our local directors in your neck of the woods, all their contact information can be found on our website: www.fnswo.ca. In this time of rest and renewal, we wish you the best of health and happiness.

Let this be the best season yet.

Stacie Carroll
Executive Director, FNSWO
Phone: 902-957-2947
Email: stacie@fnswo.ca
www.fnswo.ca

SEND YOUR NEWS

Stay in touch with your own members and share what your group is doing with others through “Contact,” a free service of *Atlantic Forestry*. Please write to dvlmagazines@gmail.com or mail to P.O. Box 1509, Liverpool, NS B0T 1K0. Deadline for our next issue is February 5, 2019.

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THINKING BIG WITH THE INFINITELY SMALL

By Guyta Mercier, F. Eng., under the scientific supervision of Patrick Lenz Ph.D., research scientist, Canadian Wood Fibre Centre, Natural Resources Canada

The production of conifer seedlings for reforestation purposes involves the use of genetic improvement techniques that have been around for the last few decades. They have greatly helped increase the hardiness and growth of propagated species. Now, there is also genomic selection and somatic embryogenesis, two techniques made possible by scientific progress in genetics, computer science and cell culture.

First Figuring Out What Nature Does Best

In the beginning of genetic improvement programs, researchers identified and selected natural forest trees, by focussing on rapid growth rate and form. These selected trees were established in first-generation seed orchards which supplied the seeds for nursery stock. Once those trees were mature, crossbreeding of the best trees in the first-generation orchard gave way to second-generation seed orchards. However, it has taken over 20 years to confirm if this progeny actually had the desired traits and build a collection of parents for other selection and breeding cycles. Currently, researchers have the technology to select superior trees for a variety of traits including wood quality, good taper, and resistance to certain insect pests and diseases.

Genomic Selection: From Lab to Forest

Progress in genetics, the improved knowledge of tree genomes¹ and the advent of more powerful computers have opened the door to genomic selection, i.e. the selection of desired traits based on genetic markers. To start, DNA needs to be extracted to determine the genetic markers in the genome. This is where the collection of parents with confirmed traits is used as a reference for building prediction models. The most obvious benefit of genomic selection is the time needed to select for desired traits. As traits are predicted and not measured in growing plantations, genomic selection takes less than 10 years compared with 28 years for the traditional selection method (Figure 1).

Somatic Embryogenesis

To benefit from improved genetics and rapidly produce elite tree seedlings, another scientific advance called somatic embryogenesis is now widely used. This method makes it possible to vegetatively propagate trees with the desired genetic traits and obtain genetically identical seedlings. To do so, embryonic tissue is extracted from stem cells and then cultivated in vitro until a mass of cells is created. The cell mass

is then differentiated and spread on a culture medium until embryos develop. The embryos are then grown to maturity to become seedlings (Figure 2).

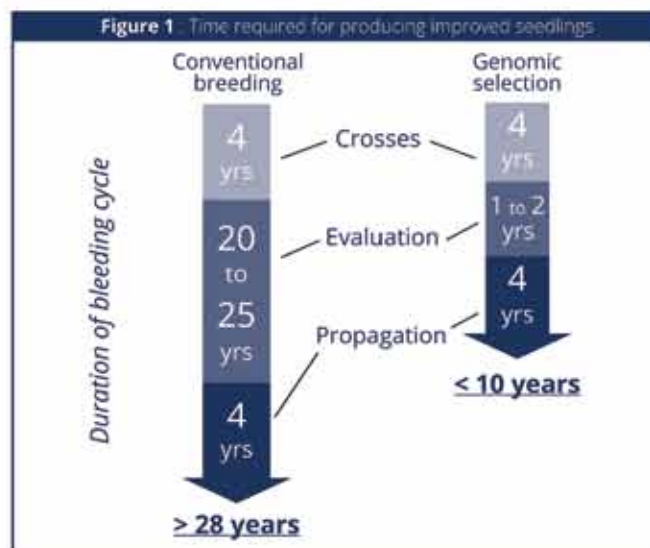
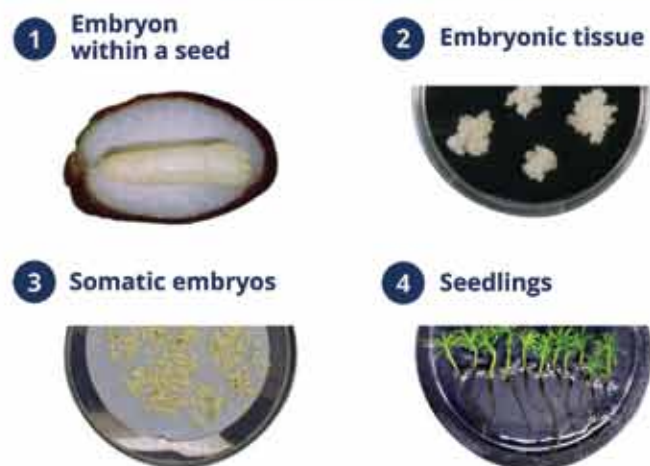


Figure 2 Somatic embryogenesis stages



¹ The genome represents the complete set of genes or genetic material present in a cell or organism. For spruce trees, the genome has between 27,000 and 30,000 genes.

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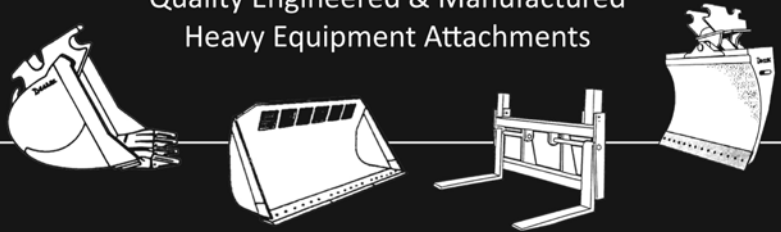
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LONGTIME RELATIONSHIP CONTINUES



L-R: Donnie Carroll, logging operations leadhand, Derek Dunphy, operator, Dougie Calhoun, operator (missing from pic)

Just like a bottle of wine getting better with age, so is the longtime relationship between Carroll Enterprises and Moncton, New Brunswick-based Log Max Forestry Inc.

The 26 year relationship between contractor and dealer began back in 1992 when Edison Carroll purchased one of the first five Log Max units introduced to North America. And, just as any longtime relationship grows and goes through changes, Carroll Enterprises have consistently kept up with the changes made over the years to the Log Max product line.

Recently, the central New Brunswick based logging contractor purchased a new Log Max 7000 Xtreme equipped with a top saw to replace an aging processor unit. "We wanted to have a harvester head with the versatility to process ugly hardwoods behind a buncher or harvest standing timber," says Donnie Carroll logging operations supervisor for Carroll Enterprises.

Operator Derek Dunphy likes the combination. "It's faster and stronger than what we were previously using and I like the fact that tech support is only a phone call away."

Today, Carroll Enterprises utilize four different Log Max models: a 6000B, 7000C, 7000TWIN and number 14 and newest addition to the fleet, a 7000 Xtreme with top saw- all installed on Tigercat carriers.

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