CANADIAN SILVICULTURE

SPRING 2004

Ecosystem management

Fertilization for planted seedlings

Integrated Landscape management

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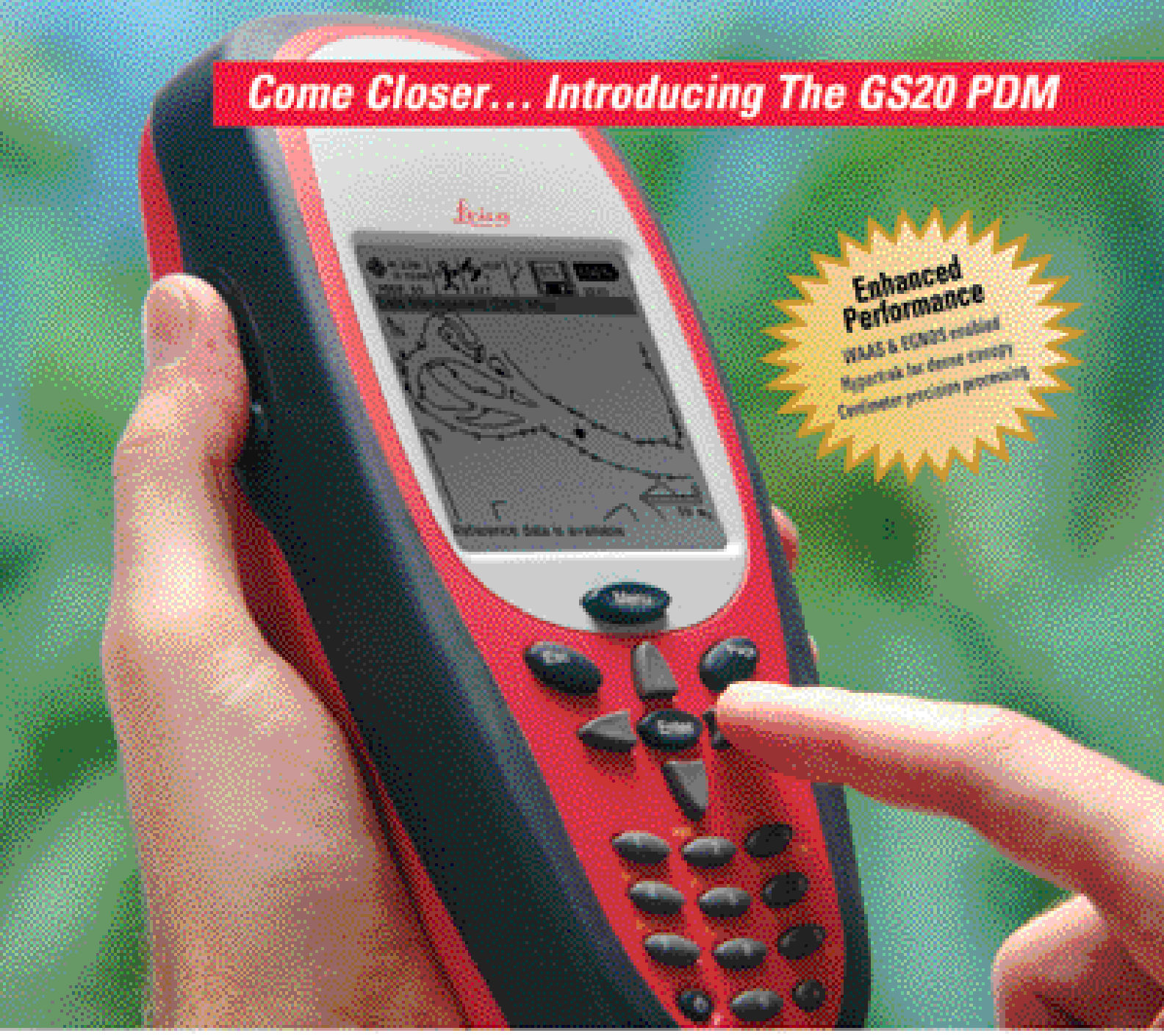

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EDITORIAL

Questions from a father

by Dirk Brinkman

On May 20th 2003, 20 year-old tree planter Julia James drowned in a Ford Excursion that was driven into Tibbles Lake by a drunk co-worker at 11pm. Colin James, her father, gave a moving speech to the Western Silvicultural Contractors' Association at their conference in February. His whole address 'Some contractors need to foster leadership'can be read on-line at www.wsca.ca. This issue's editorial is Colin's voice challenging BC's silviculture industry - challenges that apply equally well across Canada.

"It is not until tragedy strikes that we shine a spotlight on our culture. Well, tragedy has struck, and in the last 10 years it has struck 13 other times (in BC). This is unbelievable and unacceptable.

There are those that might think that Julia died because one other person made a terrible and impaired choice for which he languishes, potentially for the next four years, in a Federal penitentiary. There is more that happened that day and much that did not happen that day that needs to be talked about.

It was a camp full of young people, people just like our Jewels. People on the threshold of their lives. What coach, when putting together what he hopes will be a winning team, would weight it so heavily with youth? Where were the "elders", where were the mentors, where were the old hands who could counsel and guide these young people in more than just the requirements of their work? There was nobody looking out for Julia that night and, frankly, there was nobody looking out for…the driver who had been drinking… that night.

When accepting fees from campers, the company is, to all intents and purposes, the "operator" of that camp, and as such has a responsibility for the camp and the safety of those in it. It is irresponsible to allow the drinking of alcohol and for it to go unchecked and unmonitored. When you give out alcohol as a "management tool", as a "thank you" or just as "the glue that binds", you have a responsibility to every person present that you will get them home safely and you have a responsibility to their families and the general public.

That night Matty, armed with nothing but his courage, valiantly dived in frozen (4C) waters three times, desperately trying to save Julia. Outside of that, no attempts were made, no ideas were put forward, no plans put into action, no problem solving embarked upon (until five o clock the next morning).

A hundred yards from the accident site was a heavy equipment machine shed. On the shores of the lake in the campsite were six kayaks. There were numerous company vehicles equipped for "off road" (4 x 4's with lift kits/winches). Nearly everyone can see why it was so hard to get Julia out of the truck under the water, but no one can understand why that vehicle was not literally ripped out of the water in a respectable time.

Because tree planting is so brutally hard, there are very few old timers left. You have to find those qualities that an elder has, in those who come back each year, you need to recognize these qualities, nurture and reward them.

So that there is somebody there that has some degree of maturity, who can see impending disaster and who can respond to it.

You people here today are the elders of your industry. I can see people here the same age as me, but many are a lot younger--you are still the elders. Get together, talk about these things and find solutions, because one death is too many.

I know that the business is competitive and I know that you have to fight for those jobs. You have to sharpen your pencils. But there are places to save money. It doesn't have to be at the expense of safety.

The kids that I have talked to, they love what they do. They love the feeling that they get from being out there in the bush and doing something that they consider worthwhile - something that feeds and nurtures them. Keep them coming back, don't lose them. Keep them coming back and keep them alive."

Colin asked the Chief Coroner for a Coroner's Inquest, which would look into the underlying conditions surrounding his daughter's death. Since then, a Coroner's Inquiry of Judgement was undertaken. The WSCA is supporting Colin's request in response to FISA's initiative to eliminate fatalities (see page 16). Both will also be available on the WSCA web site when they are public.

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Fertilization for Planted Seedlings

Current Methodology and Results

by Robin Rose and Diane L. Haase

During the past several years, the use of fertilizer to improve performance of outplanted seedlings has grown dramatically. Controlled-release fertilizers (CRF) are the most commonly used products for reforestation. CRF have great potential to increase growth and competitiveness of forest seedlings for a variety of outplanting sites. However, CRF formulation, release behaviour, and environmental interactions must be considered in order to use these products successfully. The Nursery Technology Cooperative (NTC) in the Department of Forest Science at Oregon State University has conducted fertilizer research on various CRF products and found a range of results. This article provides a brief overview of fertilizer methodology and a summary of results from NTC studies.

Organic products (e.g. manure, sludge, sawdust, or compost), Nitrogen-reaction products (e.g. ureaform or IBDU), and polymer-coated products (e.g. Osmocote, Nutricote, or Apex) are the main CRF in use for forestry applications. Organic products tend to have a lower percentage of nutrients than synthetic fertilizers and therefore must be applied in greater quantities. The elements in organic materials can be variable and can release unpredictably. However, these products may provide an inexpensive CRF option and have been used successfully in a variety of applications.

Nitrogen-reaction products are created via chemical reactions of water-soluble nitrogen compounds, such as urea or ammonia, with an aldehyde. This results in complex molecular structures that provide a slowly available source of nitrogen in fertilizer blends which are broken down by microbial activity (ureaform) or hydrolysis (IBDU).

Polymer-coated products are considered the most technically advanced form of CRF and consist of a soluble nutrient

core surrounded by a water-insoluble coating. Unlike nitrogen-reaction products, coated fertilizers allow for the slow release of other nutrients in addition to nitrogen. Release rate is dependent upon the coating thickness and composition, as well as the environment in which it is applied. Polymer-coated CRF are given a specific release rate by the manufacturer, usually ranging from 3-18 months. However, this rate is based on a constant laboratory temperature. The actual rate of nutrient release under field conditions can vary quite a bit from the label and is usually not at a steady rate. Most products release a percentage of nutrients shortly after application. The remaining nutrient release is dependent on time, temperature, and moisture. The pattern of fertilizer release can differ significantly among products. Also, release patterns of individual nutrients can vary. In an NTC study, we found that, depending on the manufacturer's release rate, only 19-38% of P and less than 10% of micronutrients released after 14 months in field soil while 48-79% of K and 63-85% of N, released during the same period (Figure 1). The low P and micronutrient release was attributed to the formation of insoluble compounds within the fertilizer prill.

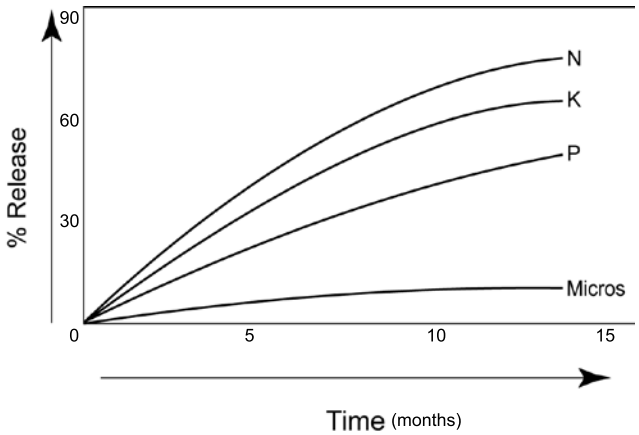


Figure 1. Release of individual nutrients differed significantly in a field trial to assess CRF release rates (lines represent averages of products with three different release rates).

CRF can be used in a variety of reforestation settings such as greenhouse production, bareroot production, and field fertilization. Fertilization at the time of planting and incorporation directly into the growing media of containerized seedlings are currently the two most popular application methods in the Pacific Northwest. Applications at the time of planting are done by applying CRF to the bottom of the planting hole for close proximity to the root zone, or by dibbling CRF to the side of the seedling root system, or by broadcast application of fertilizer around the seedling stem. Incorporation of fertilizer into containerized growing media is done by uniformly mixing CRF at a specific rate prior to filling the containers for sowing. This method supplements liquid feeding in the greenhouse and, when longer-release products are used, increases nutrient availability during the first season after outplanting.

The magnitude of response to CRF can be notably different from site to site. Site conditions, particularly temperature and available soil moisture, can have a profound effect on the level of response one can expect from fertilization. Vegetative competition, soil fertility and other environmental characteristics will also affect the amount of fertilizer response.

In a NTC study, styro-20 Douglas-fir (Pesudotsuga menzeiseii (Mirb.) Franco) seedlings were grown with CRF-amended container media and outplanted to two sites. The greatest response to CRF was found on the coastal site with high annual precipitation. Fertilized seedlings had up to double the growth and stem volume of non-fertilized control seedlings during the first five years following outplanting (Figure 2 and 3). Foliar nutrient concentrations were higher in CRF-fertilized seedlings than controls, through the first growing season, but did not differ in subsequent seasons. The same study was installed at a drier, inland site where seedlings grown with CRF-amended media also had significantly greater growth than non-fertilized control seedlings although the magnitude of response was only half that of seedlings planted on the wetter, coastal site.

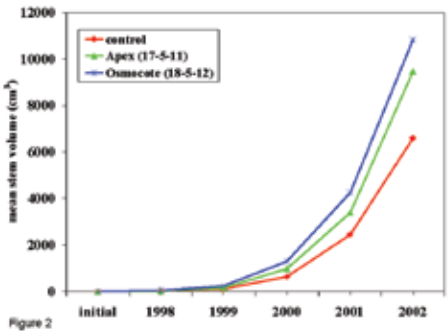


Figure 2. Five growing seasons after out-planting, mean stem volume was greatest for container seedlings grown with CRF-amended media in the nursery. .

In drier, warm environments, fertilizer has not had the same positive impacts. Under high temperatures, there is a possibility of fertilizer "dumping" which can lead to toxic salt accumulation, especially under dry field conditions. This increases the risk of poor

Figure 3. This seedling grown with CRF-amended media showed a dramatic growth response to the fertilizer. Left: 20 months after outplant (2.2 m height, 29 mm basal diameter); Right: 32 months after outplant (3.7 m height, 52 mm basal diameter).

seedling growth or a rise in mortality. On a site in eastern Oregon, application of CRF to the planting hole resulted in reduced survival of Douglas-fir and ponderosa pine (Pinus ponderosa Dougl. ex Laws.) seedlings compared to non-fertilized controls (Figure 4) and there were no differences in growth after two seasons. In a controlled pot study, CRF was applied in a single layer beneath the root system of transplanted Douglas-fir seedlings. With increasing CRF rate, root penetration through the CRF layer was significantly inhibited which was attributed to changes in soil osmotic potential due to CRF nutrient release. A study on a droughty site in Oregon's Willamette Valley showed that seedlings fertilized with a relatively high rate (60 g) of CRF in the planting

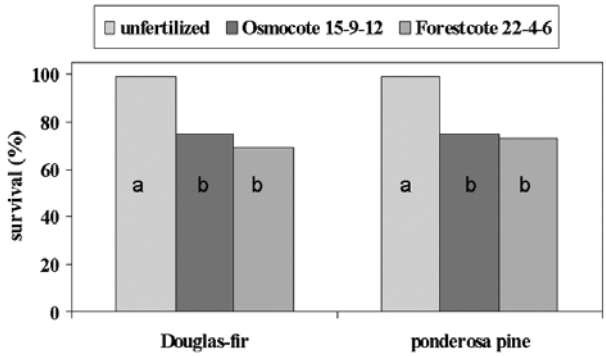


Figure 4. Survival after one field season for seedlings planted with and without CRF in the planting hole on a dry site.

hole, became significantly more drought stressed and had less root growth than non-fertilized controls during the first growing season after planting.

Many lessons have been learned on the use of CRF for reforestation. However, there are still many unanswered questions. Fertilizer manufacturers and forestry professionals are working together to modify CRF formulation and technology as well as to understand site-specific applications. As we continue to develop our understanding of forest nutrition management, we can expect to see increased interest and understanding regarding CRF technology accompanied by improved greenhouse and field performance.

Robin Rose and Diane L. Haase are with the Nursery Technology Cooperative, Department of Forest Science at Oregon State University. They can be reached at 541-737-6576 or go to www.for.orst.edu/coops/ntc for further information.

Integrated Landscape Management:

Planning the road to sustainability?

by Stan Boutin

What do Alberta's forest industry and energy sector have in common? Well for starters, they disturb an equivalent amount of land when conducting their business. For example, Alberta Pacific Forest Industries cuts roughly 15,000 ha to provide the 2.5 million m3 of wood needed for its pulp mill each year. On the same landbase, the energy sector clears 11,000 ha for pipelines, seismic lines, well-sites and oil sand mines. This strikes at the heart of a more fundamental commonality of these two resource sectors, namely that they share the same finite landbase, and their long-term viability depends on a new way of doing business based on coordination of activities and knowing each other's business.

Recent changes in societal demands require that forests be managed for biodiversity as well as wood supply. This has led to ecosystem-based management whereby new harvest

practices are aimed at maintaining the Range of Natural Variability (RNV) in forest age, stand structure, and stand size normally found in unlogged forests. This "coarse filter" approach comes with the basic assumption that staying within the RNV is the best way to minimize the risk of losing some of the myriad pieces (species) that make up complex forest systems.

This is no simple task and it becomes more difficult when the energy sector is added to the mix. In Alberta, the energy sector creates some 12,000 km of new linear features per year and current projections are that the amount of human-caused edge will grow by 12 per cent in the next 2 years. This is clearly outside the bounds of RNV. Further, current government regulations for reclamation of well sites and seismic lines have no provisions for regeneration of trees on these features. In fact, only about 10% of seismic lines have returned to natural vegetation after 30 years. Although the total current footprint is relatively small (1-2%), it is growing at the rate of 5-10% per year fuelled by the $100 billion infrastructure investment planned by the energy sector over the next 10 years. To view this another way, the forest industries' productive landbase (its capital) is shrinking by the above each year. It doesn't take a rocket scientist to figure out that if this were to continue in the future, there will be no sustainable wood supply.

What can be done? In fact, a lot. The fundamental challenge is to minimize the size, duration, and intensity of the collective human footprint. The Alberta Chamber of Resources has launched the Integrated Landscape Management Program aimed at finding ways in which energy and forestry companies can co-plan road development and reduce the time it takes for trees to regrow on seismic lines and well-sites. Although it sounds simple, the short-term planning horizon of conventional oil and gas made it difficult to link with the long-term nature of forest harvest planning. This has changed as the energy sector moves to Steam Assisted Gravity Drainage (SAGD) projects that have 20-30 year planning horizons. Other initiatives have involved incentives to cut seismic lines in new ways. Traditionally, lines were 8 m wide, whereas 76% of the lines cut this past year were 1.5-4 m. This not only reduces the amount of commercial timber that is cut but these narrow lines recover to natural vegetation much more rapidly, decreasing linear edge and access to areas by people and critters. If fully implemented, these "footprint conscious" best practices could result in a 20% reduction in footprint, over business as usual by the year 2020. And surprisingly, companies are finding that these changes actually save money, particularly when costly road infrastructure can be reduced.

It is clear that best practices can reduce the growth of our collective footprint but we can't lose site of the fact that total footprint will still be double or triple over the next 20 years. No one wants to put limits on the prosperity that can be generated from the forested landbase in Canada. That being said, the landbase is finite and every activity leaves some footprint. Given this reality, it is clear that Canadians face some tough trade-offs as we seek a future where forestry, energy, and agriculture are sustained in conjunction with biodiversity, clean water, and viable ecosystems. This basic concept seems tough to grasp but some new computer models are helping stakeholders understand some of the tradeoffs and risks involved. Sophisticated landuse projection models such as ALCES (A Landscape Cumulative Effects Simulator) allow interested parties to see how their plans, along with those of competing interests, lead to a future landscape under the constraints of a finite landbase. The models track a host of interesting things that range from jobs to oil and wood supplies to caribou abundance and carbon stocks. The models aren't capable of predicting the future but they do an excellent job of showing how combining a series of relatively simple but independent plans (individual sectors) rarely adds up to a future that we would like to see.

Government has a big role to play in all of this too. Despite many attempts to manage natural resources and land use in a comprehensive integrated way, government departments still largely operate as single line agencies, each with a growth mandate. This ultimately

leads to one agency affecting the other because the landbase is finite. Although each jurisdiction has plans and regulations in place, there is little to no exchange between the silos. This can result in regulations that can be counter-productive to other sectors (e.g. reclamation of well sites to grasses and forbs instead of trees) and a future landscape that appears to be planned in an ad hoc manner. Governments have to break down sector silos and begin to plan land use as a single collective body through improved information availability and exchange between departments, and alignment of regulatory policy.

In summary, the road to sustainable forest management comes with the realization that our finite forested landbase is shared with a diverse array of interested parties. There are compelling reasons for industry, government, and the public to get serious about integrating this diversity into any land planning exercise aimed at minimizing the risk of losing some or all of the parts. Integrated Landscape Management is providing industry with new footprint conscious best practices, encouraging government to break down single sector silos, and developing tools that allow stakeholders to assess the relative risks of different strategic landuse plans.

Stan Boutin is a professor in the Department of Biological Sciences at the University of Alberta. He can be reached at 780-492-1297.

Bio-energy

CONFERENCE

Forest Expo will be receiving funding from Western Economic Diversification ((WD) for the Bio Energy Conference and Exhibition to be held in conjunction with Forest Expo 2004, in Prince George June 2nd & 3rd. Prince George is the centre of the world's largest source of wood fibre for conversion to energy and as such has become a focus for International attention to meet global energy requirements using "green" sources.

Currently we export more than 340,000 tons of wood pellets for energy per year from the north.

In addition to bio-energy from wood bi-product sources, the conference will examine other biological waste energy systems such as garbage and geothermal systems.

The purpose of this conference and exhibition include:

• Acquiring technical and hands on knowledge to develop energy from bio-waste

• Increasing international and local awareness and investment in Bio Energy initiatives

• Leveraging our position as a major manufacturer and exporter of superior wood pellets, establishing Canada and BC as a world leader in Bio Energy technology.

• Plant and study tours of pellet plants and bio energy systems throughout BC, including Vanderhoof, Houston, Quesnel, Armstrong and Princeton.

The audience will include the local and regional community, communities with pellet manufacturers and other energy systems, in fact the entire north, as well as the international energy industry.

Forest Expo is Canada's Top Forest Industry Trade Show and this important addition is going to attract a unique, progressive and exciting international element to an already great venue" said Trudy Swaan, General Manager for Forest Expo. "We're pleased that Western Economic Diversification is a leader and promoter of Bio Energy and they are supporting this initiative."

Insect ecologist finds better way to predict damage

Damage to white spruce and subalpine fir by the two-year-cycle spruce budworm can now be predicted more easily and more accurately.

Natural Resources Canada research scientist Dr. Vince Nealis has developed a forecasting method that takes advantage of the fact that Choristoneura biennis, unlike other budworms, lives and feeds for two years!

"The usual way of predicting defoliation by budworms is to count egg masses laid in the previous year. But that doesn't work very well for the two-year cycle budworm. A better way of predicting damage by this insect is to look at defoliation in the first year of feeding when it is light and predict defoliation in the second year of feeding when it is more severe", says Dr. Nealis.

Not only is the sampling schedule of this new method more flexible, no special processing techniques are required and there are fewer sources of error.

"Even the most experienced observer can fail to find and count all the egg masses or insects on a branch but most people readily recognize needles that have been chewed," notes Dr. Nealis.

By using damage, and not the insect, as the measure, Dr. Nealis and Insect Ecology Technician Rod Turnquist were able to correctly predict defoliation in 14 of 15 sample plots!

Forest managers need to know ahead of time if there'll be severe damage by the two-year-cycle spruce budworm so they can plan and organize control actions.

A bit about budworms

Budworms are less headline-grabbing than the notorious mountain pine beetle. But the two-year-cycle spruce budworm, along with its "relations" -- the spruce budworm and the western spruce budworm -- affected almost 900,000 hectares of British Columbia forest in 2003!

Unlike bark beetles that kill trees outright and get people's attention, budworms' impacts are much more subtle. They don't strip a tree of all its foliage but instead chew new growth. As a result, it takes several years for a tree to die from defoliation and, often, several years for damage to be noticed. Analysis of growth rings by Natural Resources Canada research scientist Dr. René Alfaro has shown, though, that losses of productivity to budworms are impressive.

"Predicting defoliation by Choristoneura biennis" by Dr. Vince Nealis and Rod Turnquist can be ordered, at no cost, from the Canadian Forest Service Bookstore at bookstore.cfs.nrcan.gc.ca as can "Susceptibility of northern British Columbia forests to spruce budworm defoliation" by Dr. Alfaro, S.P. Taylor, R. G. Brown and J.S. Clowater.

Team will uncover what's in dead wood

Five forest scientists are pooling "ologies" -entomology, pathology, nematology and molecular biology -- to find out what crawls on, creeps in or colonizes trees after they've been killed by the mountain pine beetle.

"When we know what nematodes, fungi, yeasts, bark and wood boring beetles may infest beetle-killed timber, we'll have a scientific basis upon which to assess the implications of moving wood that harbours these organisms outside the borders of the beetle-infested area," says Natural Resources Canada research scientist Dr. Eric

Co-op student Linda Mavin hangs samples of mountain pine beetle-killed wood.

Allen. He is coordinating the multi-partner research project with Natural Resources Canada entomologist Dr. Lee Humble.

Pest risk analysis such as this is important because data collected will either reassure domestic and international trading partners that unwanted organisms will not enter their ecosystems. Or, equally important, it will validate any trade restrictions that may have to be put in place.

An eery-looking room at the Canadian Forest Service's Pacific Forestry Centre in Victoria is the site of this investigation into the "phytosanitary" risks of mountain pine beetle-killed trees. Bagged in slim shrouds of ghostly nylon netting - and hanging in pale imitation of the forests they were once part of - are over 300 lodgepole pine wood samples, each taken from beetle-killed timber and suspended from one of two tiers of specially-constructed ceiling-high steel racks.

Once a week, technicians check to see what insects may have emerged and dropped into small plastic bottles affixed below.

"They'll be identified using our laboratory rearing facilities and the insect collection here," says Dr. Allen.

Fungi and nematodes are a little trickier to find and label because they don't just drop into a bottle. Instead, they are extracted and identified using morphological and molecular identification methods.

Silvicultural Contractors' Association

by John Betts, Executive Director

Two major initiatives in British Columbia could have a major impact on the province's forestry contractors, as soon as this spring. The first was announced in January when the Forest Safety Task Force released its major report outlining how the province will eliminate fatalities and serious injury in the forest sector. The document makes 20 recommendations calling for the establishment of an industry-owned infrastructure to implement a provincial forest health and safety accord. Included in the plan are the certification of certain forest occupations such as fallers and supervisors and the pre-qualification of contractors in order to bid on work.

Unfortunately, the silvicultural sector was not included in the process that led up to the final recommendations, even though the report recognizes that the silvicultural activities are part of the forest sector. The report is less specific as to whether the recommendations will apply to silvicultural contractors, seeming to focus on the logging and harvesting side where most serious injuries and fatalities occur. The report is silent on the fate of the Forest Industry Safety Association that has recently tried to position itself as a health and safety association capable of handling the whole forest sector. FISA's fate, and the fledgling silvicultural sector health and safety scheme linked to FISA, is in the hands of the Task Force Implementation Team. The WSCA was asked to join the Implementation Team in early March.

Following last summer's wildfire season, the public's imagination has been more fully engaged on the wildfire threat. The province's Firestorm 2003 Provincial Review released its report, in late February, calling for the province to lead in the development of a strategic plan to improve fire prevention in the province. Much of the program would centre around reducing forest fuel buildups, an area where silvicultural contractors have a direct stake. Although the report recognizes that the province lacks the expertise and the capacity to execute a major program in the short-term, there is the potential for a whole new or at least revitalized forestry contracting sector to emerge in the next few years.

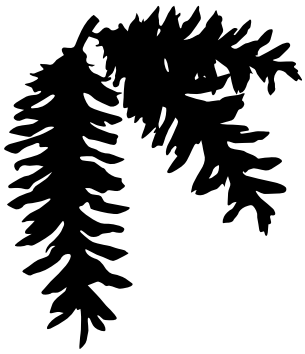
The report calls for the return to prescribed burning as a management tool as well as changes in the stumpage system to allow for the harvesting and utilization of small diameter wood and bio mass. In some cases thinning, pruning, piling and burning will be required, all work that contractors are already experienced in. New opportunities for training in prescribed under-burning and ecosystem restoration work could also generate business opportunities.

Unfortunately, the report was silent on the role private sector contractors played in fighting the 2003 fires. More than 1700 contract crews fought fires last year, in expanded and initial attack roles, but they received no mention in the report. The review recommends increasing the number of government unit crews. Contractors questioned this proposal noting that there are hundreds of experienced firefighters available in the private sector.

Alberta was not exempt from wildfires last summer either, adding another season to a string of bad fire years. One major fall-out from the last few fire seasons east of the Continental Divide is the area of burned over land that has accumulated with no restorative treatments, particularly reforestation. According to contractors, there is a huge backlog, that needs to be restored to productive forest, for which there seems to be no funding or willingness on the part of government or industry to address. This spring the WSCA will meet with Alberta contractors and various industry and agency representatives to discuss increasing forest management practices in the province.

Forest Renewal Co-operative Inc.

by William F. Murphy, R.P.F, General Manager



It is getting to that time of year when all activities in the silviculture industry are focused on the regeneration of the cut overs, private land, and information gathering for next year's program. We at the Forest Renewal Co-operative Inc. are presently doing something similar, in that we are looking at several research projects with our members and non-members involving new growth anti-oxidants, stock type analysis, re-measuring existing trials, planting surveys and hybrid poplar trials. If you are interested in doing a trial or survey as a non-member, you can contact us at the number below.

Each year, the Forest Renewal Co-operative puts on a Stock Handling Workshop in various areas throughout Ontario. These workshops include a slide show of good and bad handling of seedling stock, both container and bare root. A speaker comes in to talk to the group on various aspects of seedling stock, either within the nursery or in the field. We view actual results of bad planting with live demonstrations, and there is a question period. If you wish to attend one of the scheduled workshops or would like us to put one on in your area, please refer to our website www.lustr.ca or call 807-343-8669/8313.

The Forest Research Partnership headed up by Tembec, and supported by the Ontario Ministry of Natural Resources, held a two-day conference in Timmins on silviculture research. This research is of a practical nature and is designed to look at ways of increasing the allowable cut by 10% in 10 years.

The newly formed Ontario Forest Business Association is looking at the needs of businesses associated with the forest industry or working directly in it. This association is open to all sectors of the forest industry. Following is the intent of this association:

Vision: It is our vision that there will be a successful and vibrant forest business community in Ontario.

Mission: To promote development, growth and communication among business, working in partnership with government towards the viability of Ontario's forest businesses.

Guiding Principles (Draft)

* Support and encourage successful private enterprise.
* Provide a network to "on the ground" forestry personnel and contractors/ operators addressing local needs and issues.
* Establish a positive working relationship with all levels of government to address problems, issues and concerns that affect the business people working in the forest sector.

We are hoping that this will branch out to the other areas of Ontario, with the Thunder Bay Group being called the Northwest Section.

You can obtain additional information on membership from Mr. Brian Kurikka, Confederation College Forestry Centre, PO Box 398, 1450 Nakina Drive, Thunder Bay ON P7C 4W1. Phone 807-475-6643 or fax 807-475-0887.

par Marc-André Lapointe

Impact des travaux sylvicoles sur les communautés

L'industrie forestière représente pour la province de Québec un moteur économique important. Par exemple, en 2002 un peu plus de 25 % des exportations canadiennes de bois, de pâtes, de papiers et de cartons provenaient du Québec. Ces exportations ont généré un surplus à la balance commerciale de plus de 9 milliards de dollars pour le Québec. De plus, environ 34 % des 726 villes de la province, où il n'y a qu'un seul secteur d'activité industriel, oeuvrent à la transformation du bois. Malgré l'importance stratégique de cette industrie, une bonne partie des investissements en travaux sylvicoles devant assurer le rendement soutenu de la forêt est remise en question. En fait, la recherche tend à démontrer que les travaux d'éclaircie précommerciale ne seraient pas rentables en termes sylvicoles et en termes financiers : l'augmentation des volumes de bois ne justifieraient pas les investissements requis.

Toutefois, les retombées générées par les travaux d'éclaircie précommerciale, qui représentent environ 50 % des sommes investies en sylviculture sur les terres de la Couronne au Québec, ne se limitent pas uniquement à la forêt : les entreprises de travaux sylvicoles jouent un rôle structurant dans leur milieu économique. En effet, les régions ressources où se concentrent les travaux liés à la forêt, souffrent généralement d'une faible diversification industrielle, rendant ainsi cette industrie le seul moteur du développement social et économique. Malgré ce rôle primordial pour les régions ressources, peu d'études ont tenté d'identifier et de documenter les incidences socio-économiques des travaux d'éclaircie précommerciale pour ces régions. Dans la situation où les pouvoirs publics remettent en question les investissements en éclaircie précommerciale, il est impératif d'adopter une approche systémique et de reconnaître le rôle que les entrepreneurs sylvicoles jouent dans leur milieu. Ainsi, dans une optique de développement local durable, les décideurs seront mieux outillés pour réviser leurs politiques, leurs décisions ou réorienter leurs investissements.

La recherche future doit permettre d'identifier et, dans la mesure du possible, de chiffrer les impacts tant financiers, économiques que sociaux que génèrent les travaux d'éclaircie précommerciale dans les régions ressources.

Plus particulièrement, il faut :

1. Déterminer les incidences économiques directes, indirectes et induites qu'engendre chaque dollar investi en travaux sylvicoles dans la ou les régions retenues pour l'étude ;

2. Déterminer les incidences sociales que génère l'industrie des travaux sylvicoles dans son milieu ;

3. Déterminer les incidences financières pour l'ensemble des intervenants dans l'industrie – les gouvernements, les communautés, les entreprises de travaux sylvicoles et les entreprises de transformation.

Les incidences financières doivent être mesurées en termes de flux monétaires disponibles aux entrepreneurs. Quant aux incidences économiques, elles doivent être analysées en termes d'emplois et de recettes et/ou de bénéfices des sociétés qui sont directement ou indirectement attribuables à un projet ou un programme. Ils découlent d'une part, de la création, du maintien ou de la perte d'emplois des individus et, d'autre part, de l'augmentation marginale des recettes des sociétés. Toutefois, les retombées d'un programme ou d'un projet ne se limitent pas aux seules incidences économiques. Les incidences sociales sont aussi évaluées. Elles relèvent du niveau de bien-être que procure le programme (les travaux d'éclaircie précommerciale) ou le projet aux individus qui en subissent les conséquences. Elles englobent des réalités comme les avantages écologiques, le niveau de scolarité, l'appartenance à son milieu, la cohésion sociale, la réduction des risques pour la santé, etc.

La détermination des incidences d'un projet, d'une activité ou d'un programme est une étape nécessaire dans le calcul de ses retombées et de son rendement. L'évaluation rétrospective de l'ensemble des incidences permet d'évaluer les résultats réels engendrés par certaines décisions ou certains investissements antérieurs. Le cas échéant, à la lumière des résultats le décideur, en l'occurrence le Ministère, pourra réviser ses politiques, ses décisions ou réorienter ses investissements, mais cela en toute connaissance de cause.

Marc-André Lapointe, Doc. Sc. Éco. Appl,
Professeur titulaire, Université de Sherbrooke

by Marc-André Lapointe

The Community Impact of Forestry Management Services

The forest industry is an important economic engine in the province of Quebec. In 2002, for example, slightly more than 25% of Canada's exports of wood, pulp, paper and cartons originated in Quebec. These exports gave rise to a trade balance of more than nine billion dollars in Quebec's favour. Furthermore, approximately 34% of the 726 single industry towns in the province are concerned with wood processing. Despite the strategic importance of the forest industry, a substantial part of the investment in forestry management intended to ensure sustainable yield in the forest is now being called into question. In fact, research tends to show that precommercial thinning practices are probably not profitable in either forestry or financial terms: the increased volumes of wood do not seem to justify the outlays involved.

The results produced by precommercial thinning activity, which accounts for roughly 50% of the amounts expended on forestry management on Crown lands in Quebec, are not, however, limited only to the forest: forestry management companies play a defining role in their economic setting. As it happens, resource regions in which forestry activities are concentrated usually suffer from a lack of industrial diversity, and thus the forest industry becomes the sole driver of social and economic development. Despite this fundamental role in resource regions, few studies have attempted to identify and document the socio-economic consequences of precommercial thinning practices in those areas. In a context in which public authorities are questioning investment in precommercial thinning, it is imperative to adopt a systemic approach and to recognize the part that forestry contractors play in their area. Thus, with a view to sustainable local development, stakeholders will be better equipped to to revise their policies and decisions, or to redirect their investment.

Future research must enable us to identify, and, if possible, to quantify the financial, economic and social impact that precommercial thinning practices create in resource regions.

More specifically, we must:

1. Determine the direct, indirect and implied economic consequences resulting from each dollar invested in forestry management practices in the regions under study;

2. Determine the social consequences arising from the forestry management industry in its area;

3. Determine the financial consequences for all stakeholders in the industry – governments, communities, forestry management companies and processing firms.

The financial implications must be calculable in terms of the cash flow available to the contractors. As for the economic consequences, they must be analyzed in terms of jobs and income, and/or of company benefits that are directly or indirectly attributable to a project or program. They are derived, on the one hand, from the creation, maintenance or loss of individual jobs, and, on the other hand, from marginal increases in company income. The fallout from a program or a project is not, however, limited to its economic consequences alone. The social consequences have also to be evaluated. They arise from the level of well-being produced by the program (precommercial thinning practices) or project for the individuals who are affected by it. They include concerns such as ecological advantages, education levels, local adherence, social cohesion, the reduction of health risks, etc.

Determining the consequences of a project, an activity, or a program is a necessary stage in the calculation of its fallout and its profitability. Retrospectively evaluating the totality of its consequences allows us to assess the real results produced by certain previous decisions and investments. If the case arises, the decision-maker, in this context the Ministry, may, in light of the results of the study, revise its policies and decisions or redirect its investments, but it will be able to do so in full knowledge of the facts.

Marc-André Lapointe, D. Appl. Econ. Sc.
Professor, University of Sherbrooke

NEW BRUNSWICK

AGFOR REPORT

by Gaston Damecour

The Select Committee of the New Brunswick Legislative Assembly on Wood Supply has finished its deliberations and is preparing its report. The Committee's report is expected to fuel another round of discussions.

In February 2004, the New Brunswick Department of Natural Resources released a report prepared for it by the Atlantic Provinces Economic Council (APEC), an economic think tank based in Halifax. The report, "The Potential Economic Impact of Proposals to Increase the Wood Supply", unfortunately does not move beyond the confines of the Jaakko Pöyry report (JPMC).

Two-thirds of the report focuses on the economic importance of the forest sector; the last third focuses on the economic benefits, namely GDP and employment. The report estimates that "about 1,150 silviculture jobs are required on average each year" at current Crown silviculture levels (JPMC's Scenario 1) and that "about 2000 workers are required for the first five years, with almost half of these used for planting." Essentially, New Brunswick would need "an additional 660 planters and almost 200 workers for pre-commercial thinning."

There was a chronic labour shortage, in Eastern Canada, in the 1970s, which was gradually offset by the progression of mechanical harvesting systems. By the mid-1980s, mechanical operations had displaced many of the already experienced conventional forest workers who were using chainsaws; some of these displaced workers became thinning saw operators. Those silviculture workers are now 20 to 30 years older.

By 1989, the sector's human resource needs had increased, driven by the new skill requirements that resulted from changes in the type of work - mechanical, silviculture. Both the NBFPA and the New Brunswick Federation of Woodlot Owners had embraced the objective to double the wood supply over the next 35-50 years. With that objective came the demand for increased silvicultural productive capacity.

AGFOR recently conducted a cursory review of the provincial forest sector's human resources at the current scenario one levels. It reinforced the need to take stock of the next generation of silviculture workers. What we found are pockets of fairly serious shortages of skilled spacing saw operators, an aging work force, and a difficulty to attract new workers. Where will the productive capacity come from to meet current requirements?

Both the demographics and the competing interests for youth make this a challenge, not just for silviculture but most of the forest sector. The next 10 years will see significant attrition of technical and professional staff due to retirement and career changes. The enrolments in forestry institutions across Canada are down by as much as 50%, suggesting that students are attracted to other disciplines - or no longer attracted to forestry.

What happens if the Government of New Brunswick goes ahead with the increased silviculture activity promoted by JPMC? The best resource management systems and objectives are of little value if they are not executed and if wood is not delivered to the mills. There lies an important opportunity for skilled and experienced silviculture contractors and workers. According to Dirk Brinkman, "There is a net decline in silviculture across Canada. Over the past decade, both contractors and talent migrated westward out of Nova Scotia and New Brunswick in response to the increase in intensive silviculture in BC's FRBC programs of the 1990's and the more recent spacing programs in Alberta. These people became highly skilled. Similarly, there will be no shortage of people available to conduct the silvicultural treatments that might be contemplated in New Brunswick's relatively modest forest area." Perhaps it is time to enlist Premier Bernard Lord's repatriation efforts.

Gaston Damecour is a Registered Professional Forester in New Brunswick and Nova Scotia. He is a senior consultant and principal of AGFOR Inc and has been instrumental in bringing about significant changes in the forest sector by representing both governments and industries on such issues as health and safety, wood allocations and forest management policy. He has worked with communities and businesses and various interest groups in Canada and France to initiate change.

PRINCE EDWARD ISLAND

FOREST IMPROVEMENT ASSOCIATION

by Wanson Hemphill, Manager

The ground is frozen at night and soft during the day limiting wood movement but making maple sap run.

Richard Ablett, the Director of BioScience Development for PEI, gave a detailed presentation at the FIA Annual Conference, on March 27, about the PEI Bioscience strategy. With $100 million of research investment and 32 bioscience private companies, government and the university working together, PEI is leading the way in bioscience research and development. Forest product opportunities include medicinal, botanicals, food products, pharmaceuticals and chemicals.

Kevin Forgrave of Northumberland Marketing Board in New Brunswick gave a presentation on the Pan-Canadian Certification System for Private Woodlot Owners. Northumberland has completed a pilot audit of 10 member forests and offered suggestions on how PEI might begin this process with an Implementation Committee.

FIA has just completed the Voluntary Sustainable Management Practices for Forest Contractors booklet that offers tips and suggestions for working with owners of private forests under the headings of management planning, road construction, wildlife enhancement and safe harvesting methods. This 32-page booklet will also be used to work towards forest certification as well as improve forest owner confidence and the image of the forest industry.

GPS training using the Garmin 76 and Oziexplorer mapping software has just been completed with funding assistance from the PEI Model Forest Project.

More environmentally-friendly hydraulic and chain oil options were presented at the FIA Annual meeting with displays on Greenplus (www.greenlubes.com) and Petro-Canada Environ and Bio 40 hydraulic oil and Super-Flo canola chain oil.

Safe and productive mud season.

CANKER Threatens the Future of Pre-Commercial Thinning of Poplar

by Fabien Simard, RPF

Last summer the Quebec Forestry Management Manual Committee speculated in its management manual about the possibility of discontinuing the practice of pre-commercial thinning of poplar and mixed stands that are mostly poplar. Indeed, in view of the appearance of the hypoxylonian canker in certain stands that had been pre-commercially thinned, the committee was rightly concerned about the effect of this practice on the timber yield. The committee members chose to continue pre-commercial thinning of poplar in the general forestry management plan for one more generation, particularly because of the lack of information and documentation that provided a convincing demonstration of the causes concerned. Many studies and research projects have been published on the canker but few general conclusions have been drawn. In fact, several of the studies contradict one another. For example, certain studies point to a considerably reduced presence of the canker in pure stands, whereas other studies demonstrate the opposite. The members of the AETSQ approved the committee's unwillingness to take a definite stand, in view of the fact that several questions such as the following remain unanswered:

• Has the canker been observed only on a few sites, or on several?
• Was the canker present before thinning took place?
• Is the canker more evident in the thinned areas or in the control areas?
• Does the canker develop on sites of every quality?
• Has the canker been observed in stands of every origin: pioneer, transition or climactic?

What is the impact of the canker on the stratum if the presence of the canker reaches 2, 4 or 6%?

Does the canker develop primarily in old overgrown areas?

The AETSQ members who have carried out pre-commercial thinning in poplar stands are convinced of the positive yield of the practice, as shown in the two photos below. On the other hand, companies carrying out pre-commercial thinning in poplar are agreed in stating that we should have guidelines (for example, from a well-targeted research project) to allow professional foresters to identify more readily strata that are not vulnerable to the canker, in order to better plan and prioritize the stands available to them.

The following photos show the same 8 year-old stand.

Pre-commercial thinning took place five years ago.

No thinning was done in this stand.

Forest Ecosystem Management: An Invitation For Forest Stewardship

by Phil Burton

It has been over ten years since the phrase "ecosystem management" was introduced as the latest paradigm to guide the management of public forest lands in North America. It arose in the United States at a time when the U.S. Forest Service was re-examining its role in facilitating (read: subsidizing) the timber industry, while being faced with challenge after challenge under the Endangered Species Act. That era culminated with the Forest Ecosystem Management Assessment Team (FEMAT) recommending that two-thirds of timber sales in the Pacific Northwest be curtailed to protect the northern spotted owl and associated old-growth values. Since then, ecosystem management has been advocated as a progressive approach to conservation in forestry, range management, fisheries management, and other natural resource disciplines around the world.

It is easy to be skeptical about the true significance of forest ecosystem management when many forest companies and government agencies claim to have adopted it, yet so many policies and practices continue in a "business as usual" manner. Is "ecosystem management" just another buzzword, to be put on the shelf with "multiple use," "biodiversity protection," "integrated resource management," and "sustainable development"? Does it differ from these other terms in any real and distinct way? Is it just more conversation biology? Are the principles of ecosystem management concrete enough to give us any real guidance in managing forest lands today?

Well, yes, ecosystem management does have a few key principles that make it distinct, although academics and practitioners alike have tried to make it all things to all people. In its most basic (and hence its most useful) form, forest ecosystem management is distinct from other paradigms in the following ways:

• all forest attributes, values, goods and services are considered and treated holistically;

• the long-term sustainability of all forest values is paramount, making human use

or harvest secondary; and
• humans, nevertheless, are considered part of the ecosystem, with resource use and management interventions permitted and often necessary to establish or restore a sustainable mix of forest values.

Thus forest ecosystem management has much in common with sustainable forest management, multiple-use sustained-yield management, and integrated resource management. It may involve public participation to aid in the identification of forest values, and it may advocate the emulation of natural disturbances as a management template, but these activities are not central to its identity. Ecosystem management is certainly not a preservationist movement, and it does not advocate a "hands off" approach to nature. For example, it recognizes the need for tree removal and prescribed burning in parks, where such activities are part of a plan to restore ecological integrity.

From the above description, it might appear that ecosystem management is simply about "looking after" the natural world, or being a "wise steward" of our natural resources. This is true – being a forest ecosystem manager evokes images of someone like Aldo Leopold, re-establishing pine stands and patches of tallgrass prairie on his Sand County farm in northern Wisconsin. Examples are even more widespread today: Merv Wilkinson practicing uneven-aged forest management in his woodlot on Vancouver Island, wildlife managers burning longleaf pine stands in Florida and Georgia, Quebec farmers managing their sugar bushes for firewood, fence posts and deer as well as syrup, foresters thinning trees and creating gaps in second-growth Douglas-fir stands in Washington state to accelerate the development of old-growth characteristics. Hundreds of other examples probably exist, often associated with families managing their private property, or communities managing small tracts of public land. The common features of finding ecosystem management being put into practice seem to be:

• a sincere commitment to the sustainability of forest ecosystems, not just timber or any other one product;
• a fairly small scale of operations; and
• continuity in management vision and responsibility, often in the form of a single individual.

These features might explain why we see such little evidence of forest ecosystem management on the corporately managed and publicly owned forestland base across Canada. Alberta Pacific Forest Industries might be able to manage forest ecosystems on the scale required for woodland caribou, but the task becomes more difficult at the scale of individual sites and stands of trees. Forest products companies are (by definition) in the fibre processing business, making it difficult for their CEOs and boards of directors to view non-timber values as anything but constraints. Likewise, provincial governments have been oscillating in their willingness to recognize (and invest management resources to sustain) non-timber values, and to deal with many diverse operators rather than a few large licensees. The demands of forest certification have outstripped government-imposed forest practices regulations, and public demands for parks and jobs have largely bypassed any debate about management paradigms. Progress in attaining the goal of sustainable forest management has been made in fits and starts across

Canada, but rarely with forest ecosystem management as a governing approach. Lately, governments and companies pre-occupied with international trade disputes and global competitiveness have been paying little attention to non-timber values such as forest recreation sites, pine marten, wild berries and mushrooms, or overall ecosystem health. What will it take for forest ecosystem management to be implemented on most of the managed forest lands in Canada? Several facilitating conditions and mechanisms suggest themselves:

• a commitment by provincial governments to safeguard the full suite of forest ecosystem attributes, goods and services, backed up with suitable resources to do the job;

• such rigorous market-based and product certification demands that forest products manufacturers have a strong incentive to achieve the same results;

·• more scientific evidence demonstrating how diverse healthy ecosystems contribute to cost-effective strategies for the productive and reliable generation of marketable goods and services;

• area-based forest tenures and management obligations, or unlinking forestry from the control of fibre processing facilities;

• the repair and restoration of damage done to environmental values, with costs shared by the benefactors and supervisors of past actions; and

• the delegation of long-term stewardship responsibility over discrete and compact areas of land.

This is a long list of requirements, with a slim chance of being implemented any time soon. Yet I remain optimistic that we will one day see the adoption of forest ecosystem management in Canada's forests. Research is slowly documenting the true value of woodpeckers and mushrooms, is debunking the need for aggressive site preparation and brushing, and is coming to grips with the factors contributing to uncontrollable wildfires and insect outbreaks. Management responsibility for more and more public land is being turned over to First Nations, community forests, and woodlot operators, engendering diverse and place-based approaches to sustainable forest management. Even on industrial forest lands, woodlands operations are being freed up from the direct control of the mills, and forest products companies are considering long-term stewardship contracts for third parties to regenerate, restore, and enhance harvested forest lands. A smaller-scale way of doing things, with a lot of personal attention and commitment requires a jardinage (gardening or farming) mentality, but there are many people who would like to indulge in such a lifestyle. The era of forest ecosystem management in Canada is yet ahead of us.

Phil Burton is the Manager of Northern Projects for the Pacific Forestry Centre of the Canadian Forest Service. He is based at the University of Northern British Columbia, in Prince George, B.C., and can be reached at pburton@nrcan.gc.ca or at 250-960-6130. His latest project was coordination and co-editing Towards Sustainable Management of the Boreal Forest, a book recently released by NRC Press and available through http://pubs.nrc-cnrc.gc.ca/. The views expressed here are solely his own, and do not represent the policies of the Canadian Forest Service or Natural Resources Canada

by Joachim Graber

The world's best athletes know that a warm-up program to strengthen, limber and mold muscle is key to stellar performance on the playing field. Dr. Delia Roberts, a biology professor at British Columbia's Selkirk College, has a theory that if training and regular exercise, focused on upper body strength, benefited athletes, along with a monitored, customized diet, the same would hold true for tree planters.

Dr. Roberts first put the theory to the test in the cut blocks of northern Alberta, where tree planting crews in the Grand Prairie region were prepped and primed before they hit the fast pace of the planting season. Improvements to worker productivity as well as safety performance were seen almost immediately. Control groups of tree planters were able to plant more trees, while suffering fewer injuries and a lower infection rate.

Tree planters have historically been plagued by high rates of injury. Typically, the workers are young, many with sedentary lives, who are suddenly thrust into the wilds of bush life. They are paid according to the number of trees they plant and their days are long and laborious.

Each year, it's estimated one in five of the approximately 8,000 tree planters employed in British Columbia is injured on the job, with between 120 and 200 cases reported. According to statistics from the Workers Compensation Board, injuries to tree planters cost about $2 million each year.

FISA, the Forest Industry Safety Association, in British Columbia realized the significance of Dr. Roberts' studies. Weyerhaeuser provided initial funding plus the pool of tree planters for her pilot programs. At the WSCA conference in Victoria, BC, FISA presented a cheque for $20,000 to Weyerhaeuser to ensure Dr. Roberts' training program is delivered as broadly as possible to the tree planting community.

The money funded the creation of a tree planters' resource package that is available on line at www.selkirk.bc.ca/treeplanting. The site contains PDF files of the "Training Log", "Top Ten Tips – How to Eat to Keep Planting", "Power Eating for Power Planting" which includes menus for camp cooks, as well as a training video, "Fit to Plant". Hard copy versions of the material were distributed to planting companies for their use in the field.

So, while the studies are in and the theories are proven under controlled conditions, getting the news out to as many prospective tree planters as possible through the companies who hire them, is the next hurdle. Both FISA and Weyerhaeuser will monitor whether the materials are being used and how, in this voluntary process. At the end of the season, a determination will be made as to how successful this process was, and plans will be put into place regarding how the program will be continued for the next season. The ultimate proof of the benefits of training and good nutrition will come when the program is adopted industry-wide as mandatory.

"As an association, our goal is to employ pro-active initiatives to improve safety performance throughout the industry," says Jim Chorney, FISA general manager. "This funding is provided specifically to fund a program to assist tree planters prepare for their seasonal work as well as keep them healthy throughout the planting months."

Think of it as spring training. More and more tree planters will be better prepared to take on the fast-paced, grueling work of the season. And they'll perform at a record pace, with fewer injuries.

That's a home run for everyone.

Joachim Graber is Manager of Training & Development at FISA - Forest Industry Safety Association in Prince George, B.C. He can be contacted at 250-562-3215 or jo@forestsafe.ca or visit www.forestsafe.ca

BC Forest and Paper Industry grows in 2003 despite obstacles

The financial picture for British Columbia's forest and paper industry improved slightly in 2003 versus 2002, according to financial performance results for last year revealed by PricewaterhouseCoopers at its 17th Annual Global Forest and Paper Industry Conference in Vancouver. The BC industry's position as an efficient and low-cost producer allowed it to weather the loss of over CAD 1 billion in revenue from the dramatic appreciation of the Canadian dollar and the payment of CAD 635 million in duties on softwood lumber shipments to the U.S.

The BC forest and paper sector earned CAD 400 million in 2003, up from CAD 100 million in 2002. Return on capital employed (ROCE) for BC's industry in 2003 is estimated at 4%, up from 2.5% in 2002. Return on capital employed (ROCE), a key business indicator for global forest products, measures the industry's profitability generated from the significant capital invested.

If the BC industry had not been hindered by the 8 cent improvement in the average value of the Canadian dollar from 2002 to 2003, nor been handcuffed by the 27.2% penalty on softwood lumber exports to

low-cost operations

and emphasis on efficiency translate into earnings of CAD 400 million in 2003

the U.S., BC's earnings would have been almost CAD 2 billion and ROCE would have been close to the minimal accepted level of 10-12%.

"The BC industry has endured 2003 in the face of unprecedented pressures, including duties on U.S.-bound lumber and having taken a CAD 1 billion hit from the appreciation of the Canadian dollar," said Craig Campbell, leader of PricewaterhouseCoopers' global forest and paper industry performance improvement practice. "A big reason for the success of BC's industry is the low-cost, efficient model the industry has been fostering for the past few years. By running more efficient and larger mills, lumber companies are able to improve recoveries and profits."

Logs are the highest single cost of producing lumber. The ability for companies to efficiently extract the most value from logs and convert them to lumber, with the lowest costs possible, is critical to maximizing ROCE and profitability. The strong earnings in 2003 are a result of the fact that BC companies have implemented practices, re-tooled mills and expanded operations that are now allowing them to realize cost reduction earnings at mediocre prices.

The lumber recovery factor (LRF) – the volume of lumber extracted from a log – in the BC interior region has increased every year for at least the past 17 years from 1986, the first year of the annual PricewaterhouseCoopers survey.

BC's balance sheet improved significantly in 2003 in relation to 2002. The debt equity ratio at December 31, 2002 was 0.66 and it fell 21% to 0.52 at December 31, 2003. It is noteworthy that BC public companies have the lowest debt equity ratio in the world. Comparatively, Eastern Canada sits at 1.26, the U.S. at 1.41 and Europe at 0.78.

"Western Canadian companies have among the strongest balance sheets in the world with debt being only 52% of equity in 2003 – which is down from 66% just one year ago," said Campbell. "To put this in context, the entire BC industry has a debt equity ratio of 0.52 and a debt of approximately CAD 6 billion. Three of the largest U.S. forest and paper companies each have over USD 10 billion in debt and debt equity ratios of close to 2.0."

For more information onPricewater-houseCoopers' Global Forest and Paper Practice or to view thought leadership on current and future industry trends, visit: www.pwc.com/ca/forestry.

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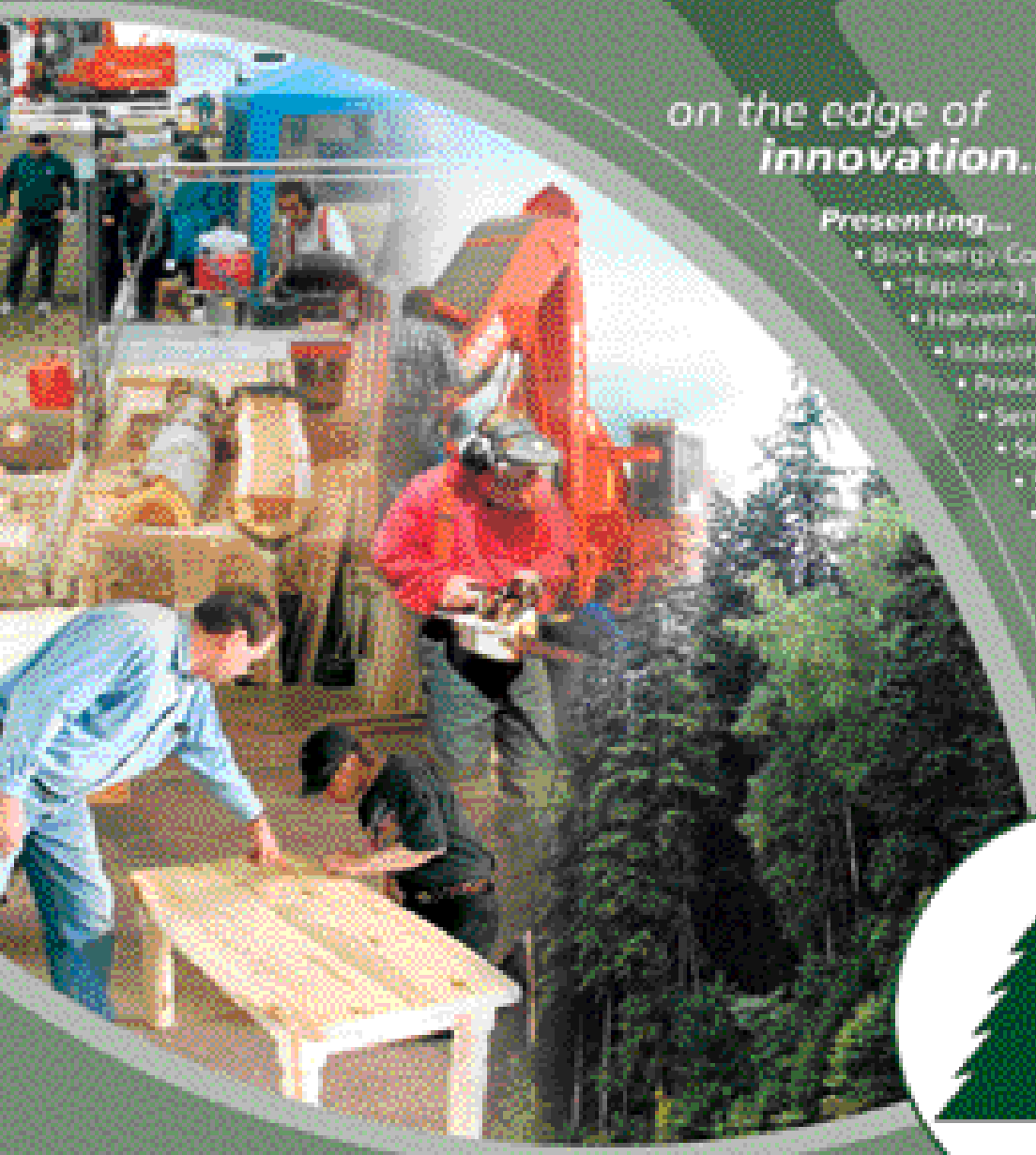

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Cansel Acquires Marfor

Cansel and Cansel Resources are pleased to announce the acquisition of Marfor Equipment Ltd. of Fredericton, New Brunswick. This partnership combines the strengths of both organizations to bring more value to their forestry customers in the Atlantic region.

"Cansel is very pleased to be working with Marfor to jointly offer our customers a better selection of products and services," stated Lovett Lewis, president of Cansel. "We are also very pleased that Chris Finnamore of Marfor has joined Cansel and will continue to focus on delivering excellent customer service."

"By teaming up with a national company, we are able to bring further value to Marfor's customers by leveraging a large customer service infrastructure and increased buying power," stated Gordon Young, president of Marfor.

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