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SPECIAL FEATURE

From the ground up: SITE PREPARATION AND SOIL REHABILITATION

PLUS

BC Jobs and Timber Accord reviewed

Regional Silviculture Reports avec résumés en français

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Golden spruce cover photo by Reese Halter. Inset photo: Wyatt Silva Tiller.

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The Jobs and Timber Accord: Can we make the best of a complex situation?

Dirk Brinkman

In a departure from a decade of "sunset industry" gloom, Premier Glen Clark introduced a "sunrise industry" where jobs would increase by 37,800 people by the next election in 2001. To reach this goal, Clark promised the AAC would increase three-million cubic metres through accelerating cutting permits, and increase further through a new Innovative Silviculture Practices Agreement.

But these jobs initiatives have become mired along a bureaucratic path, which goes something like this: the forest industry pays super-stumpage to the Ministry of Forests (MOF) through a complex pricing formula; the funds are paid into another large bureaucracy called FRBC; these funds are returned to forest companies if their five-year proposals establish FRBC-approved partnerships with First Nations, IWA Canada, community representatives, and other stakeholders; both MOF and the Ministry of the Environment must approve prescriptions; the regional office of the new Forest Worker Agency, which trains workers and manages workers' qualifications, provides workers; these workers are paid by the IWA-organized Forest Contractors Ltd. (a new government employment agency similar to HCL), where costs for labour-intensive work similar to silviculture are double the regular labour costs; contractors get to make all of this simple enough to work if licensees still desire their services.

Obviously, it would be simpler for MOF to require licensees to extend free-growing responsibilities through to precommercial spacing, and to directly fund increasing the AAC or key forest values through a strategic intensive silviculture program. But for now, that's not going to happen.

Everyone dedicated to the silviculture industry needs to work towards making the best of this complex situation. The forest renewal side of the Jobs and Timber Accord is critical to the accord's success, since increasing the flow of volume and value from the forest is the only way to create sustainable spin-off jobs in the harvest sector.

An opportunity for the whole industry?

Clark's spin doctors have taken a page out of the IWA's historic prejudice against silviculture workers ("itinerants", "temporary", "students", "nomadic"), and some displaced silviculture workers' jobs will be going to the IWA's displaced workers ("decent", "family-supporting", "year-round", "community-based"). Still, this new accord could represent an opportunity for the whole industry.

Under the terms of the accord, the new FRBC-established Forest Workers Agency will "assist displaced forest workers by training and certifying them with the new skills they will need; assisting them in finding new employment; and creating high-value jobs with compensation and working conditions, which will allow workers to support themselves and their families."

For the past eight months, FRBC's Resource Offices in IWA locals have funded a transition program for displaced workers. Many non-IWA workers did not know about this program since it has never been advertised outside IWA newsletters. This is an excellent program because it allows workers a wide latitude of choices, so that they can train in anything counsellors agree would suit them. Under this program, each worker gets up to $20,000 in wages while they study, and $7,000 in tuition, though more is available in some cases.

The provincial government is spending this money on training a displaced workforce that will then displace a set of already trained workers. Instead, the government might have looked to the already highly skilled and experienced silvicultural workforce that is capable of carrying out a variety of silvicultural tasks. Indeed, the WSCA's recent Silviculture Industry Profile revealed that 84% of both contractors and workers engage in more than one activity— both establishing and tending plantations —and almost everyone wants longer seasons and more work.

How fair and cost-effective is it?

The accord states that in "BC's coastal forest sector, negotiations with the IWA will start in order to create an 'HCL' (Highway Constructors Ltd.) model to employ all displaced forest workers in stable, long-term union jobs. In the interior, industry and the IWA will negotiate an agreement to provide for wages and working conditions for displaced forest workers, with the model to be finalized in negotiations."

The accord calls for "fair access to jobs through a priority hiring system that first provides for hiring local (i.e., in the district) displaced forest workers, increases jobs for First Nations people, and provides a hiring process for qualified local people." The new breed of contractors developing are the IWA locals, who directly employ IWA members to build trails for parks, engage in silviculture, stream clean, and work on value-added projects.

While to some, this may sound good on paper, in practice it can lead to unfair hiring practices and exorbitant costs. For instance, Brinkman & Associates completed a labour-intensive revegetation of the roadside for the Island Highway, and discovered that under HCL, project costs were twice as high, due primarily to union-fund payments for which the workers seldom benefitted. Moreover, inexperienced workers had to be hired, and regulations were inflexible.

Whether all of these new agencies and regulations will successfully domesticate the wild silviculturalist will depend on how aggressively our industry protects the important features of flexibility and incentives that have made the quality of silviculture services world-class in BC.

Range of topics, perspectives appreciated

Dear Editor:

I have finally finished reading the Fall '96 issue (reading pile is hard to keep up with). I haven't been receiving your magazine very long, but will say that I really enjoy it. The articles are informative and cover a broad range of topics and geographic areas so one can get a variety of perspectives. My staff have a variety of backgrounds and they, too, find it informative— both the ones with no forestry background and the others with exposure to certain aspects of forestry.

Keep up the excellent work! Looking forward to the next issue!!

Regards,

Tom Rankin,
Program Manager, BC Forestry Continuing Studies Network, Kamloops, BC

Thought-provoking editorial

Dear Editor:

Your editorial in the Spring 1997 issue on Easter Island was instructive and thought provoking. I suspect the population of Easter Island gave very little though to its growth rate and resource depletion at the mid-point of its thousand-year march towards collapse.

The Canadian population is growing exponentially at 1.3% through a combination of natural fertility, and one of the highest rates on immigration in the world. If Canada was able to continue on this trajectory, its population would exceed China's 1.2 billion in 284 years. This dismal scenario should concern even those with great faith in substitution technology.

The trajectory we are on can be damped by policies that provide incentives to encourage and popularize the efficacy of two-child families and by immigration policies that seek to stabilize the Canadian population. If we do not plan our future, we risk repeating the Easter Island experience.

Peter Salonius,
Canadian Forest Service, Fredericton, NB

Editorial timely, pertinent

Dear Editor:

I just finished reading your editorial (on Easter Island) in the Spring 1997 issue.

I would like to congratulate you on the timeliness and pertinence of the article. It is too bad I did not receive my issue prior to our Earth Day celebrations here in Ontario.

I have posted the item outside my office entrance for the edification of all who pass by, and fully plan to use it as a backgrounder for Earth Day celebrations next year.

Excellent.

Peter Lewis-Watts,
Environmental Services and Approvals, Ontario Hydro

Sheepish cartoon raises curiosity

Dear Editor:

We received a copy of your magazine in the mail the other day, and have found the articles and editorial content helpful and informative.

16/37 Community Futures is one of 33 similar offices in BC that are involved in business planning and counselling for small business ventures. These can be either new businesses just starting to operate, or established businesses in need of help to grow and expand or to simply survive.

Because we live in a resource-based area, a large number of the businesses we deal with are forestry-related with silviculture companies of one form or another being a large portion of those, which brings me to the main reason I had for writing.

In your Spring 1997 issue, there is a cartoon "Notes from the Ledge" featuring a drawing of sheep and the caption "Who fired the wooley weedeaters?" We are currently dealing with a couple of small companies that are involved in weeding and stand improvement using sheep. I get the impression from the cartoon that it is in response to something published in *CSM*. Would you please supply me with a reprint of whatever article or editorial this may refer to? If there are problems developing in this industry, we would like to know now, and possibly prevent some small business from getting into a situation that is not viable.

Please don't take this as a criticism of your magazine. Everything in it is well done. This letter is simply curiosity about a comment made that pertains to an industry new to our area.

Yours truly,

Dave Andrews,
16/37 Community Futures Development Corporation, Terrace, BC

Forest labour not a rocket science

Dear Editor:

One thing I do not like about the silviculture business is its reliance and dependence on UI. It makes people lazy and apathetic about fighting for jobs. Also, it puts silviculture workers in the realm of part-time workers, and this is very often reflected in the quality of the work.

Roger Stanyer is an ass, and FRBC is full of people who have got their place at the trough. They are not workers but "professionals". These are the people who put the forest industry in the situation it is presently in. Blaming falling AAC on parks is skirting the real issue, which is really the lack of mature, accessible timber.

FRBC is in its third year and they are still dicking around. There are too many people who want a job, but don't want to really work. Just the way there is always talk of training and more training, etc. You would think forest labour was as complex as rocket science. Forest labour could almost be done year-round. You get good by doing not by sitting on UI for eight months a year.

Also, the low-bid system and running a chainsaw for more than seven-hours a day are not good. Low bid encourages mediocrity and running a saw should be a six-hour a day job. Remember, you have to work until 65.

A lot of silviculture workers are overpaid, and lots are underpaid. When you are

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monitored by some flaky forester or techie who can't do the job himself, what do you expect?

Greg Wozny,
British Columbia

Misinformed on Tobeatic

Dear Editor:

We are concerned that Aaron Schneider, in his article regarding the Tobeatic Wilderness area of southwestern Nova Scotia (*CSM* Vol. 4, No. 4), may have been misinformed or did not have all of the facts at the time of writing his editorial. We would like to set the record straight, regarding our commitment to land stewardship and the Tobeatic Wilderness Reserve, the largest (990,000 hectares) of the newly declared nature reserves in the province.

We regret we did not receive any communication from Mr. Schneider at the time he was researching and writing his article. We would have been happy to answer his questions, and share with him the following information your readers and subscribers should be aware of when considering this important issue:

1. J.D. Irving, Limited has a Crown license for a specified harvest and defers to the areas designated by the DNR to fulfill this license.

2. Mr. Schneider writes that "... Lewis Sawmill declined an invitation to meet..." This is blatantly false. Representatives of J.D. Irving, Limited were active participants in the very first public information session regarding the proposed harvesting in the Finger. There have been a multitude of meetings with community groups and leaders since that time. Our chief forester and woodlands manager were pleased to attend a meeting with the Tobeatic Wilderness Committee (TWC) in the Fall of 1995 at the TWC's request.

We are proud of our forest stewardship and commitment to sustainable forestry practices. We welcome any interested citizen or community group to come and tour our sawmill or woodlands operations — this includes Mr. Schneider and the TWC.

Kevin Hynes,
Regional Manager, Weymouth, Nova Scotia, J.D. Irving, Limited

Companies plant 100 millionth tree

Both Broland Enterprises Inc. and Buchanan Forest Products Ltd. planted their 100 millionth tree in May. The two Thunder Bay companies celebrated the event with a ceremony, which the Mayor and other dignitaries attended. Over the past fifteen years, Broland has been planting throughout northwestern Ontario, providing 300 to 500 jobs. Buchanan, involved in forest regeneration in northwestern Ontario since 1986, will plant 21 million seedlings in 1997— the largest single treeplanting program in the province.

Four billionth tree planted in BC

The planting of BC's four billionth tree at the Campbell River Museum site is a significant milestone in the province's reforestation and forest management history, said BC Premier Glen Clark. He and the other five western leaders, meeting for the Western Premiers' Conference, attended the May 29 event. Each premier planted a tree, and Clark symbolically planted a genetically improved Douglas fir as the four billionth tree.

"Reforestation...is a critical component of forest management in British Columbia," said Clark. "It is due to the enormous commitment and hard work of treeplanters across the province that we have a successful reforestation program that sees three trees planted for every one harvested. Industry will invest $130 million this year alone."

Forestry faculty investigated for human rights abuses

The BC Human Rights Commission is investigating the University of British Columbia's Faculty of Forestry for alleged anti-environmentalist and corporate biases.

Specific allegations deal with the UBC Department of Forest Resource Management, and include "hostility to teaching and research not associated with logging company 'partnerships'; hostility to the sciences and arts of conservation planning and design of parks and other protected areas; particular hostility to environmentalist and 'green left' political perspectives and recognition of a broader set of stakeholders and values; and anxieties about how even nominal recognition of left environmentalist positions might threaten current and future industry-university 'partnerships' and opportunities for outside faculty consulting while using UBC facilities."

The complaint, initiated by Gordon Brent Ingram, Ph.D. environmental planning, is limited to the 1989 to 1994 period, and was organized under the advice of the BC Public Interest Advocacy Centre. "Ingram vs. UBC" may involve hearings in the coming months.

Chainsaw defect alert

Last summer, a chainsaw kickback resulted in a fatal injury. The investigation into this forestry accident identified contributing factors including an inherent defect, which can make the Husqvarna Model 51 chainsaw unsafe during normal use. The specific model chainsaw is equipped with a muffler identified as part number 501798401.

This muffler has a spark arrestor and an exhaust gas deflector plate attached to the main muffler assembly by screws. The investigation identified that the screw holding this plate can loosen, causing the plate to detach. In absence of a deflector plate, the exhaust gasses can cause deterioration to the safety chain brake.

If you use a Model 51 Husqvarna or a Model 254 saw, equipped with this muffler part, inspect the muffler assembly immediately to ensure the deflector plate is securely attached and deterioration has not occurred to the safety chain brake.

The manufacturer Husqvarna and the Canadian distributor Buccaneer Industries Ltd. are assisting to correct this defect. If you own a chainsaw described here, return it to your Husqvarna dealer for the installation of a replacement muffler, or call (514) 562-7974.

Mercury rain falls on Arctic

A toxic rain of mercury falls on the Arctic every spring just when the Earth's ecosystems are preparing for their first burst of activity of the year, Canadian researchers say in a published report. The Environment Canada researchers, writing in *New Scientist* magazine, said the reasons for the rain of mercury, one of the most poisonous substances known, is unclear.

But they say the pattern almost exactly mimics the timing of ozone depletion, and suggested that similar processes drive both phenomena.

Reuter

Dunce cap for Canada

Environmentalists say Canada has become a problem child in the school of global responsibility, shirking its Earth Summit commitments in the name of deficit reduction, world trade and national unity.

A coalition of environmental groups released an annual report card late mid-June that slams the federal government for its behaviour since the 1992 summit in Rio de Janeiro. Canada has not only failed to meet its Rio pledges, but has moved into the ranks of the world's worst environmental players.

The marks issued in the fifth annual Rio Report Card reflect the disappointment of Canadian environmental activists with the Liberal government. For the first time, the federal government has been handed an overall failing grade for its performance. The Liberals received an "F" in six of ten areas, including their commitment to reduce greenhouse gases and protect biological diversity.

Vancouver Sun

"Free factory" in the woods

A recent paper published in the *Journal of Sustainable Forestry* (Vol. 5, Nos. 1/2) argues that the value of forests as social capital must be incorporated into the model that determines optimal harvesting. Such a model would treat forests as "social capital assets with known ecological functions that are non-marketed." To make their case, the Canadian researchers from Brock University and the Ontario Ministry of Natural Resources looked at the forest's role in absorbing carbon dioxide, which mitigates global warming.

The researchers discovered that in Canada in 1986, forests played the role of a "free factory", providing a free carbon-uptake service estimated to be worth about $28 billion. "If the forests of Canada were not here, the carbon that they process would have to be cleaned up from the atmosphere, which would carry a certain cost." The preferred cost-effective method of mitigating global warming remains reducing emissions and conserving forests.

According to the study, calculating a monetary value for a non-market service contributes to the determination of the value of forests as social capital. "Without this value, the social cost of forests is seriously underestimated, leading to over-exploitation of forest resources."

Still the wrong kind of green

The World Bank's own researchers have found that the powerful institution's environmental assessment requirements for development projects have "generated massive documents that are of little use."

Since 1991, the World Bank has stipulated that countries wanting aid must prepare environmental assessments of proposed projects. The policy is part of the World Bank's efforts to establish a greener reputation after years of stinging criticisms. Environmentalists and Third World groups have pointed to many World Bank-funded ventures that have damaged indigenous communities and ecosystems.

The internal report, which was leaked by Friends of the Earth, covered 53 World Bank-supported projects in eight countries. It concludes that the environmental assessments for these projects were often mere formalities that failed to consider alternative designs and technologies seriously, and gave only superficial attention to important issues. Many of the reviewed assessments were also unhelpful because they were not completed until after project designs had already been finalized and approved.

Alternatives

Minimize ground disturbance during site prep

The Morgan Silvatractor is built for all forestry applications, from harvest to silviculture. It features the newest hydraulic-drive technology— Syncro-Trac —which powers all four wheels evenly at all times, including tight turns and without scuffing problems. Turning capability gives even torque and less slippage, reducing site disturbance and resulting in more production when pulling bedding plows or scarifying chains, or pushing rakes.

The 137-inch wheel-base can turn 14 feet in diameter, and has three turning functions: articulation; independent front or rear and crabbing articulation and independent front or rear turning for general use; and crabbing for use in sensitive wet areas. All turning functions reduce site disturbance.

The Snake Swamp Logger is another innovation from Silvatech. This system is proven to go into the wettest terrain from tropical swamps to Canadian muskegs. The 2.64 p.s.i. ground pressure is well within Forest Practice Code standards. Designed for all types of working conditions, this machine mounds and piles in the wettest ground with virtually no ground disturbance. The on-board tool-storage area makes for convenience. Optional attachments for the Snake Swamp Logger include winches, buckets and swing grapples.

Contact: Martyn Morgan, Silvatech Industries Inc., tel (604) 850-8700, fax (604) 850-0378, <silvatec@uniserve.com>.

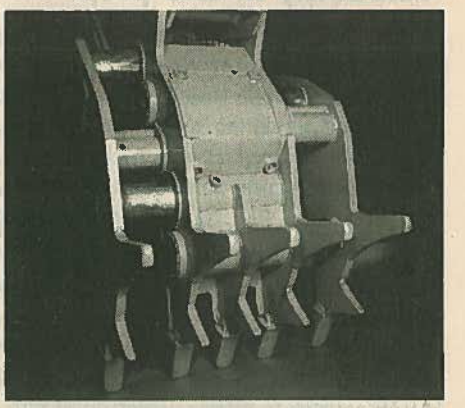
The Morgan Silvatractor is built for all forestry applications, from harvest to silviculture.

The Snake Swamp Logger mounds and piles in the wettest ground with virtually no ground disturbance.

Pile, screen, mound in one pass

A Prince George shop has designed an innovative, multi-use hydraulic silviculture rake for excavators. Finning Attachment Services is building the tool for 315 and 320 excavators, but it can be adapted easily to other sizes.

The attachment, with an optional opposable thumb, piles, screens and mounds in just one pass. Finning created the tool for G&C Contracting of Prince George. Previously, G&C used two different attachments: a wide rake for piling and screening, and a narrower rake for mounding. That meant making two passes over the site, adding to the cost, and further compacting the soil.



Finning's innovative, multi-use hydraulic silviculture rake piles, screens and mounds in just one pass over a site.

The new hydraulic tool enables operators to switch functions from inside the cab. The unit can be switched for a different attachment, such as a bucket, in minutes. Put to work last summer, the attachment

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is doing everything the company wanted: it offers operating simplicity, gets rid of one implement, makes fewer passes through the bush with less soil compaction, and decreases wear and tear on tracks.

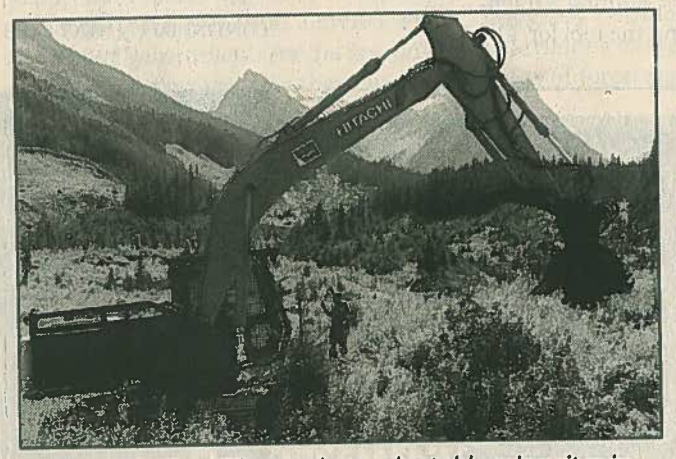
Contact: Finning, Ltd., tel (604) 872-4444, fax (604) 691-6371.

Versatility in site prep

The Wyatt Silva Tiller, a multi-use silvicultural tool, produces plantable microsites in soils that need something more than a rake or bucket attachment. It can handle steep terrain, rocky ground, wet sites, and compacted soils.

This hydraulically-powered rototilling attachment is mounted on a crawler excavator. The tiller measures 152 cm by 132 cm and weighs 1,000 kg. A medium-sized excavator (20 tonnes) is a suitable carrier. The 1000-cm long, horizontal drum rotates in either direction at variable speeds between 50 to 120 r.p.m. There are 18 teeth, 20-cm long with 5-cm right-angle cutting tips. The motors at the end of each drum run from the prime mover's hydraulic system, and require a flow of 113 litres/minute at 2900 p.s.i. Cleaning knives between the teeth prevent roots or vines wrapping around the drum.

Developed by Wyatt Silviculture Services, Ltd., of Williams Lake, BC, this tiller is a redesign of the Hytest Tilling Mounder. The new tiller incorporates variable drum speed, improved hydraulic motors, lighter construction, and easier installation to the prime mover. Still in trials, the Wyatt Silva Tiller was used last year on 320 hectares encompassing a variety of sites across BC.



The Wyatt Silva Tiller produces plantable microsites in soils that need something more than a rake or bucket attachment.

The Wyatt Silva Tiller has plenty of torque to churn up tough soils. The hydraulic motors, on each side of the head, have a four-to-one gear ratio that allows for adjustment to drum speed, depending on the material being tilled. Suitable planting mounds are placed where needed.

Extreme brush areas make use of the excavator's live thumb and the Wyatt Silva Tiller's rake for initial preparation. The tiller then mixes the underlying mineral soil, organic material and appropriate vegetation into a plantable spot that gives the seedling a head start on surrounding vegetation. Breaking up and mixing soil layers releases nutrients not otherwise available to the seedlings. The roots establish themselves quickly and uniformly in loosened soil layers.

In wet clay soils, the excavator's thumb with the tiller clears stems from the area. The tiller mixes the layers of soil providing a suitable planting site, which is raised up from the surrounding soil, allowing for drainage in wet sites. Early spring melt-off of mounds gives seedlings several-weeks head-start over the competition. Plantable spots on mounds are commonly two to four metres apart and 20 to 40 cm above the original ground surface. The machine can create tilled screefs or raised mounds, depending on the job specifications.

The Savannah Spot Cultivator creates a fully cultivated planting "spot" up to one-metre deep, and ready to take a seedling.

Contact: Guy Bailey, Wyatt Silviculture Services, Ltd., (250) 398-7177.

Fully cultivated planting spots

The latest development in the Savannah range of site preparation equipment is the 1300 Series Spot Cultivator. This rotating disk cultivator is designed to fit to the boom of an excavator and provide effective, mechanical soil preparation for hillside forest sites and areas with high levels of logs and debris. The 1300 Series is ideal for steep country establishment because work can be done either up or down a slope.

With this new tool, erosion and site disturbance are minimized because harvest debris is left on the site as mulch. Any problems of soil bulk density or compaction are addressed with full cultivation possible to a depth of nearly one metre. Moreover, the Spot Cultivator's simplicity of design makes it easy to add treatments like fertilizer and herbicide application at the time of preparing the site. Models in the series come in a range of sizes and capabilities to suit excavators of different sizes.

Contact: John Bartlam, Savannah Equipment Pty. Ltd., international fax 61-7-5446-8076.

Electronic silviculture directory

Visit the Canadian Silviculture Directory, produced by the folks at *CSM*. This most comprehensive guide to silviculture suppliers and contractors in Canada is located at <mindlink.bc.ca/silviculture>. Please do not put <www> at the beginning of the address.

Model forests get wired

Three Canadian model forests have their own web sites: McGregor MF <http://guarles.unbc.edu.mcgregor>; Eastern Ontario MF <http://www.eomf.on.ca>; and Manitoba MF <http://www.freenet.mb.ca/manmodf/>.

Also check out the International Model Forests Network (IMFN) at <http://www.idrc.ca/imfn>. This site offers news on progress in the field, and welcomes articles and announcements that you would like to share. It also includes a documentation centre that lists literature generated by the IMFN (e.g., project reports, manuals, articles), as well as other publications of note.

CIDA forestry projects online

Forestry is one of the principal sectors of assistance in the cooperation program of the Canadian International Development Agency (CIDA). Current CIDA partnerships include the Trees for Tomorrow Project in cooperation with the Jamaican government, and the Hardwood Forest Development Project in cooperation with the Honduran government. To learn more about these and other projects, visit the CFAN-CIDA Forestry Advisors Network site at <http://www.cfan-rcfa.org>. CFAN is an informal network of professionals concerned about the future of the forests and the people who depend on them. The web site includes documents describing CIDA-supported forestry projects in Asia, Africa and the Americas; papers on forestry issues; links to other CIDA resources; and the opportunity to join an international forestry discussion group sponsored by CFAN.

FERIC web site

FERIC's home page offers a brief introduction to FERIC, a list of partners in industry and government, annual reports, work programs, FERIC's publication list, and a directory of e-mail addresses for FERIC staff. The address for this bilingual site is <http://www.feric.ca>.

Home page for green mag

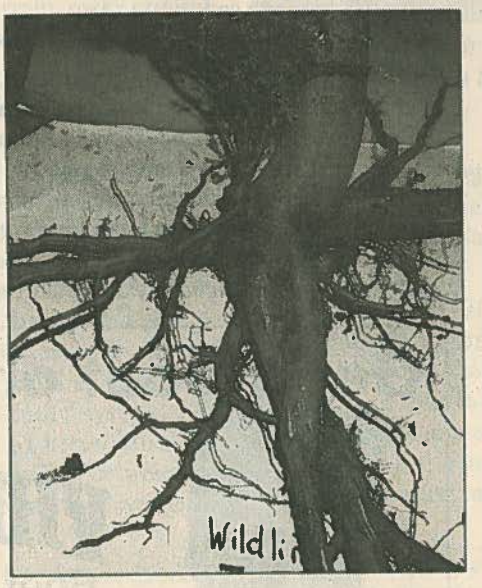
Alternatives is a journal of "environmental thought, policy and action," produced at the Faculty of Environmental Studies at the University of Waterloo. The web site features hot links to other environmental sites, a complete *Alternatives* index, a complete list of back issues and order forms, guidelines for contributors, calls for papers, and more. Visit it at <www.fes.uwaterloo.ca/Research/Alternatives/>.

Tree roots: The unexplained, hidden half

Reese Halter

Tree roots may be out of sight but they should never be out of mind. The below-ground ecosystem is intriguing, and yet to date root physiologists know very little about all the complex interactions of this system. Trees are the most dominant form of vegetation on earth, and their roots have probably evolved at least several strategies to assist them in attaining this commendable feat. An understanding of the below-ground system is essential for healthy, long-term, productive, second-growth forests. Examining several aspects of tree root growth enhances our awareness of growth beneath the ground — not only of the complexities of tree root growth but the difficulties young tree roots, initially reared as containerized seedlings, experience on cut-over sites in BC.

Plate 1. **Inter-specific root grafting between a western hemlock seedling and a lodgepole pine sapling.**



The root system

Natural trees have between four and eight structural (foundation) lateral roots. These roots are vital in supporting the many tonnes of above-ground biomass and withstanding winds, often in excess of 100 km h^{-1}. The placement of these structural laterals occurs at the root collar, usually less than 10 mm beneath the ground surface. In addition, these structural lateral roots give rise to further stabilizing roots known as sinkers. Sinker roots commence development in naturals at a very young age.

Fine feeder roots are key components of healthy trees: they rapidly exploit new soils and assist in the uptake of water and nutrients; they are ephemeral and an integral part of the overall carbon-cycling system in the organic (duff) layer. These thin meristematic roots contain potentially thousands of mitotic cells, which are vast sinks for photosynthate. Moreover, they contain a high source of amino acids, proteins, vitamins and hormones. A mature oak tree may contain as many as 500-million fine feeder roots. Furthermore, these fine roots have a symbiotic, mutually beneficial relationship with the soil fungus mycorrhiza. Mycorrhizas infect the root tips with threads called "hyphae", forming web-like structures on the exterior and penetrating some of the interior cells of tree roots. They draw carbohydrates (food) from the living root cells, and in return provide the root with increased nutrients plus water from the surrounding soil.

Another important microscopic feature that helps maintain the vitality of trees and most plants are root hairs, located within the first few millimetres of the root tip (or more accurately, "the zone of elongation"). They anchor the root to the soil particles, substantially increase the total surface area of the root system, and are admirably adapted to absorb minerals through the tip and water through the more basal regions. Persistence and frequency of root hairs varies with time of year, moisture, temperature, pH and nutrients in the soil, and markedly differs both within and between tree species.

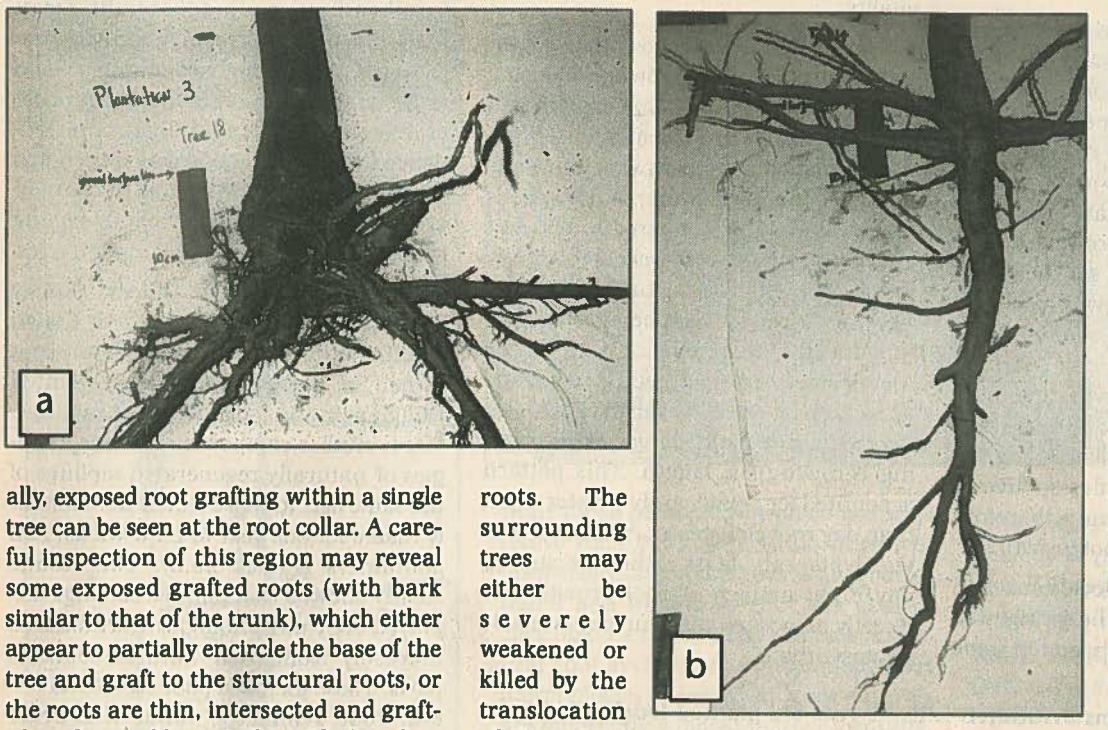
As tree roots grow or "elongate" through the soil, they do not merely progress in a straight line even if the path is the one of least resistance. Rather, root growth occurs sinuously or, as Charles Darwin recorded, "circumnutationally". That is, roots grow like the movement of a worm or snake. The actual amount of root growth is dependent upon the interaction of at least several factors including the availability of simple sugars (derived from photosynthesis in the leaves and transported to the roots via the phloem), hormones, vitamins, water, nutrients (mineral salts), oxygen, soil and air temperatures, fungi, bacteria, soil fauna, and the physical properties of the soil itself.

Plant roots are able to perceive gravity. This remarkable achievement was first recognized by European botanists at the turn of the century. The mechanism that determines gravity was found to occur at the very tip of the root, known as the "root cap". Starch (food-containing) cells in the root cap determine the downward (into the ground) direction of root growth. It was correctly postulated that the weight from these food cells caused the roots to grow downward. Tree roots in the soil have the ability to grow vertically, horizontally, and at all angles in between. The exact reasons for this are not fully understood.

Natural root grafting

It is very common for tree roots to graft both within a single tree and between trees of the same species. In addition, a study from northern BC found root grafting between two different seeded-in-place tree species — a western hemlock seedling and a lodgepole pine sapling (Plate 1). Root grafting between tree species may also be common. Occasion-

Plate 2. Root system of a typical (a) planted and (b) naturally regenerated 12-year-old lodgepole pine sapling. Note that deep taproots did not develop on planted saplings but were common on naturally regenerated saplings.



ally, exposed root grafting within a single tree can be seen at the root collar. A careful inspection of this region may reveal some exposed grafted roots (with bark similar to that of the trunk), which either appear to partially encircle the base of the tree and graft to the structural roots, or the roots are thin, intersected and grafted, and resemble part of a spider's web.

When tree roots naturally graft they share functional tissue, and therefore are able to exchange carbohydrates and water. In the Pacific Northwest forests, grafted Douglas-fir roots can support "living stumps" — that is, stumps without any foliage which grow cambial (wood) cells, albeit very slowly. These stumps derive all their food from the grafted roots of the surrounding live trees, and are able to exist for long periods of time.

Awareness of root grafting is important because, in some cases, herbicide applied incorrectly may be passed from one tree to the next via the grafted roots. The surrounding trees may either be severely weakened or killed by the translocation of the poison — an event termed "flashback". A simple and non-toxic method used in New Zealand of ridding unwanted weeds is to directly apply boiling water to the undesirable plants. This scalds and kills the growing tissues (leaves, stems and root collar), but does not adversely affect the surrounding trees.

Root growth and movement

Some tree root growth is predetermined, a phenomenon first examined by 19th-century European workers. They found that certain orders of tree roots in fact returned to their original radial direction (away from the tap root), after being deliberately deflected by as much as 90°. They coined this enigmatic response "exotropy". Under natural conditions, some roots

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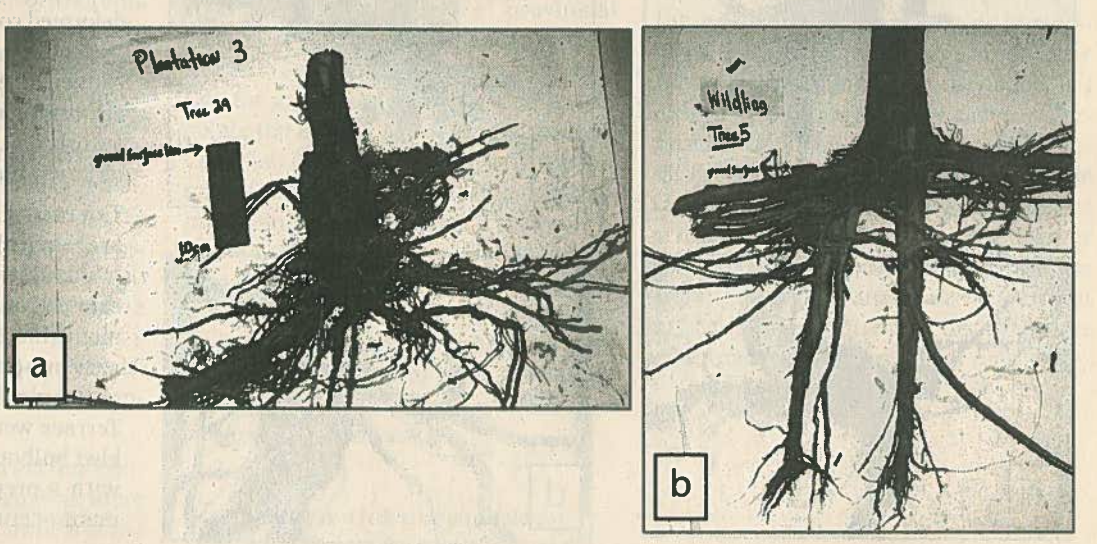
Plate 3. Lateral root development of a typical (a) planted and (b) naturally regenerated 12-year-old lodgepole pine sapling. Note the greater depth, smaller number of structural lateral roots, and the greater root collar diameter at 100 mm on planted saplings compared with naturally regenerated saplings.



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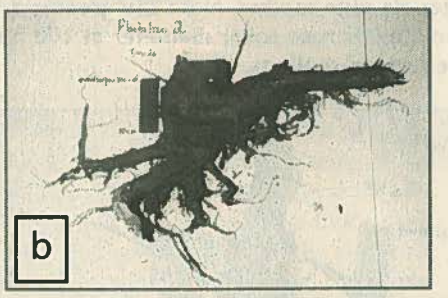
which encounter rocks apparently exhibited this ability to grow around these impediments, and continue their original (radial) direction of growth.

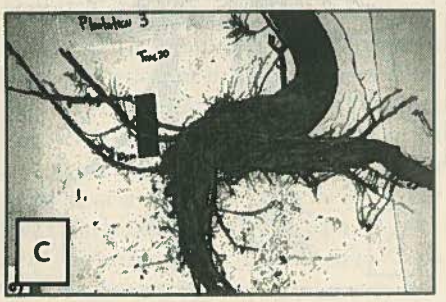
After roots die, apart from the obvious role of decomposing, the soil profile is soon left with hollowed-out, old root channels, which serve as potential new avenues for easier, future root growth. The activity of earthworms in the soil has also been shown to facilitate the movement of tree roots. Research with subalpine eucalypts in southeastern Australia found that earthworm activity substantially enhanced root growth rates. Old root channels can increase some species' tree root growth rates by as much as 60% per 24 hours. Site degradation (soil compaction or disturbance to the soil profile) is highly destructive to these old root channels, and therefore restrictive for future tree root growth.

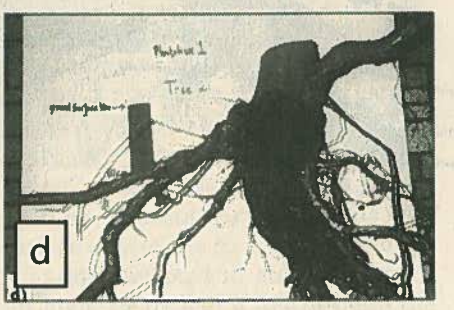
Root growth for many deciduous and coniferous trees begins in the spring, well in advance of shoot growth, and in some cases, continues long after leaves have fallen and shoot growth has abated in the autumn. Early vernal and autumnal fertilizations may be beneficial for increased root growth, and therefore overall tree vitality.

Some roots of both northern and southern hemisphere trees grow more during the night than the day. One explanation from southeastern Australia with high-elevation eucalypts, was that generally there exists a lower water stress in soils during the night compared to the day, and consequently roots were able to grow more at night than during the day. Another reason for this phenomenon was that during the daytime, cells within the root tips were mostly mitotic (smaller and actively dividing), while during the nighttime, cells were mostly larger and expanding (growing) in length. This pattern accounted for significantly greater night than day root elongation. Additionally, in eucalypts at least, this recurring day/night pattern of root growth was directly associated with current available photosynthate.

Plate 4. Root deformations associated with 12-year-old planted lodgepole pine saplings: (a) constriction — note the limited structural lateral root egress; (b) coiling — note the large structural lateral root that has wrapped around the stem base; (c) kinkiness — note the 90° bends at the root collar and in the taproot; (d) container-shaping — note the fusion of individual roots into a larger single mass and the conical shape of the root system.







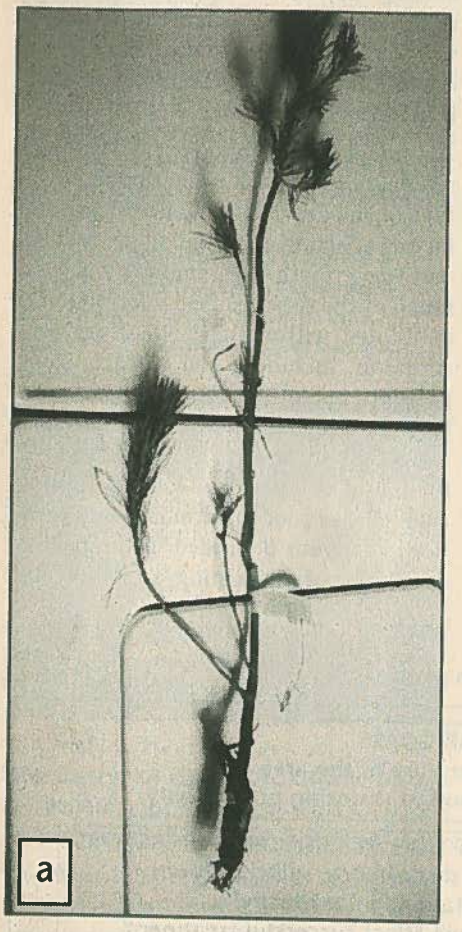
Root form of containerized seedlings

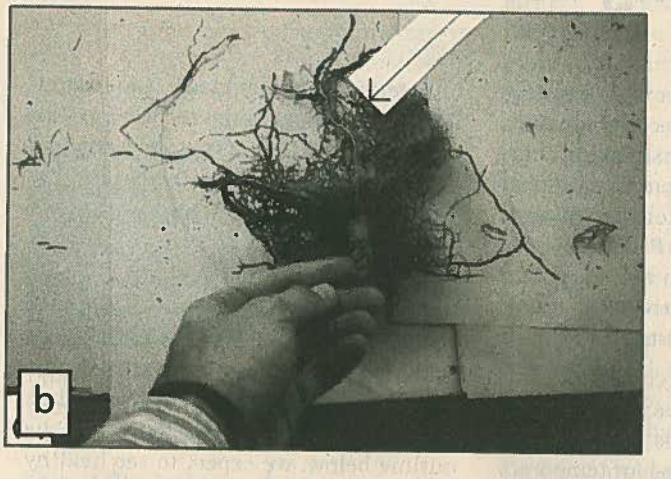
Although some root physiological processes have been elucidated, the fundamental knowledge base of root growth remains incomplete. With this in mind, it is rather disconcerting that in BC today, the artificial reforestation program is centred around containerized seedlings — an artificial reforestation method that deliberately manipulates seedling roots. Evidence from several countries has shown that seedlings initially reared in containers may pose a serious threat to sapling stability and longevity of plantation trees.

Two BC studies from Golden (Rocky Mountains) and Terrace (North Coast) examined root morphologies (or root forms) of eleven-year-old out-planted Douglas-fir and lodgepole pine saplings. These studies compared root morphologies of naturally regenerated saplings of the same age, to those which were initially reared for one year in hard-walled PSB containers (Plates 2a,b). The results clearly showed that planted saplings displayed root morphologies that differed markedly from their natural counterparts. These included poor structural lateral root symmetry, fewer first-order lateral roots, a greater distance from the ground surface to the first structural lateral root, and a greater root-collar diameter and concentration of lateral roots 100 mm below the ground line (Plates 3a,b). Furthermore, root stocks of planted saplings possessed remnants of vertical container shaping and a number of deformed roots that were either constricted, coiled and/or kinked (Plates 4a-d). Naturally regenerated saplings illustrated elaborate sinker root development and an assortment of self-grafted roots not observed on planted saplings.

The root systems of container seedlings are vertically pre-shaped; on the other hand, naturally regenerated seedlings exhibit extensive horizontal root development (Plates 5a,b). More than a decade after out-planting, the root morphologies of the planted saplings from Golden and Terrace were still pre-shaped and resembled bulbous masses of fused cambiums with a preponderance of root development occurring from the bottom of the

Plate 5. Note (a) the vertical pre-shaping of a container-reared (for one year) lodgepole pine seedling and the complete absence of any root egress, which is still very evident six years after out-planting (north of Williams Lake, BC), compared to (b) the extensive horizontal development of structural laterals and abundance of fine feeder roots, in addition to a well-developed tap root (see arrow) of a naturally regenerated Douglas-fir seedling (east of Revelstoke, BC).





former plug (i.e., many first-order roots were initiated from the root stock at more than 100 mm distance beneath the ground surface). Moreover (and of more relevance for growth modellers), these studies with the plantation species measured a slowing of current shoot growth, resulting in overall sapling heights significantly less than those of the wildlings. Poorly placed structural lateral roots and a lack of sinker roots can jeopardize sapling stability, particularly with heavy snow-loadings and/or strong winds, which are associated with the mountainous sites of BC.

In addition, it has been reported that containerized seedlings in Sweden were more prone to root disease (e.g., *Armillaria sp.*) than those of seeded-in-place naturals (*CSM*, Vol.3, No.3). More innovative artificial-reforestation methods should be initiated and funded so that the goal of developing a system that emulates a natural root system can be attained. Root morphologies of seeded-in-place naturals are inherently adapted to their local site. Hence, it would be prudent for site-specific guidelines to place more importance on accepting natural regeneration (if only) because naturals possess superlative root systems.

Reforestation is an arduous task. Efforts to date must be constantly monitored and re-evaluated. BC's entire provincial forestry program is dependent upon accurate and reliable plantation information for growth and yield models to calculate the annual allowable cut. Indeed, Canadian foresters are faced with the formidable challenge of managing (harvesting, maintaining site quality, reforesting, and stand tending) Crown lands. As the 21st-century approaches, the need for comprehending tree root physiology (the molecular mechanistic processes) is of cardinal importance to assist silviculturists in establishing healthy and therefore productive plantations.

Reese Halter is a tree root physiologist with Global Forest, Vancouver, BC.

Further reading

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Résumé

Un meilleur compréhension de la croissance d'arbre sous terre éleve la concerne regardant les semis en conteneurs. Les études démontrent que les racines d'arbres naturels sont bien adaptées aux conditions spécifiques du site, que les taux de croissance sont meilleur que pour les semis en conteneurs, et que les arbres naturels sont en général plus saines. Des téchniques plus avancées de réboisement artificiel devront être concues et fondées pour mieux emuler les gaules naturels.

Successful soil rehabilitation: (Un)Earthing the benefits

Chuck Bulmer

Soil rehabilitation is a way to restore productivity to areas degraded as a result of access construction, harvesting, or site preparation. In a number of circumstances, soil rehabilitation is required by the Forest Practices Code (FPC). Soil rehabilitation has the potential to restore productivity to areas degraded due to past forestry practices.

The FPC allows for the construction of pre-planned temporary access, provided that soil productivity is subsequently restored on the areas used for temporary access. Soil rehabilitation is also required by the FPC if excessive soil disturbance inadvertently occurs during harvesting or site preparation.

Rehabilitation of degraded areas has the potential to increase the productive land base and future wood supplies. Forest Renewal BC is funding projects aimed at restoring productivity to forest roads and landings that are no longer needed.

Despite the potential benefits, soil rehabilitation has been viewed in the past as an expensive activity that produces mixed results. Restoring productivity is no doubt an expensive proposition. For this reason, the primary focus of soil conservation efforts in BC is on preventing soil degradation. It is always cheaper to avoid soil degradation than to try and restore productivity after the fact. Still, many soil scientists and other professionals are optimistic about the long-term prospects for modern rehabilitation projects.

Modern rehabilitation projects benefit from knowledge gained from previous research trials and operational projects. In some cases, healthy forests are now growing on rehabilitated sites once used as roads and landings. Also, rates of reforestation success for undisturbed soils are now much higher than they were twenty years ago. We can expect that increased knowledge and a wider array of potential treatments will lead to similar improvements in the success rates for modern rehabilitation projects compared to older work.

A series of steps can be followed to provide the best chance of successful soil rehabilitation. The *FPC Soil Rehabilitation Guidebook* provides detailed descriptions of format-and-content requirements for rehabilitation plans, along with discussion of the considerations involved when selecting treatments. By following the outline below, we expect to see healthy young forests growing in the near future on many sites where abandoned forest roads and landings are located today.

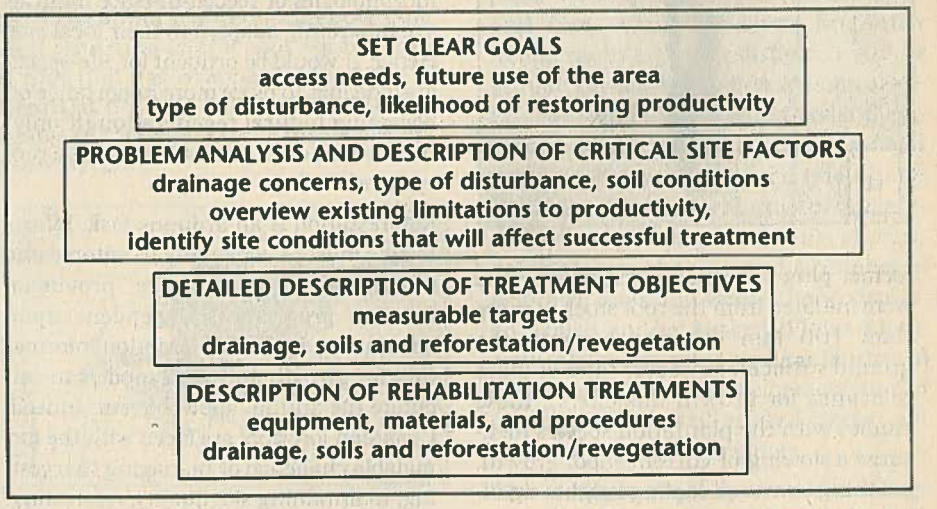
Step 1. The rehabilitation plan

Whatever the reason for carrying out soil rehabilitation, success requires that a site-specific plan be prepared. Figure 1 outlines the content requirements for rehabilitation plans. Providing stable, erosion-free growing sites and improving soil productivity to grow a timber crop is usually the goal. But for certain road segments or landings, other objectives may be given higher priority if, for example, bedrock exposure or lack of topsoil make restoring tree productivity impractical. Setting objectives for specific areas requires creativity. Where future access will be required prior to the next harvest, establishing a crop of commercial timber is not usually an option.

An important component of the soil rehabilitation plan is a description of the type of soil degradation, and critical site factors affecting drainage, slope stability, and tree growth. For temporary access, much of the required field information is contained within the silviculture prescription, including soil texture, slope position, potential rooting depth, moisture and nutrient regime. Growth-limiting conditions also need to be described, including compaction, loss of topsoil, cold soils, or poor soil drainage and aeration. For areas degraded in the past, a description of the existing vegetation and the presence or absence of topsoil is also useful, along with notes on the proximity to other areas where rehabilitation work is planned.

Detailed treatment objectives are used to describe the final soil and site conditions expected to be present after the project is completed. For example, a detailed objective may require that a steel probe can be pushed by hand into the soil to a depth of

Figure 1: Components of a rehabilitation plan



at least 50 cm over a certain proportion of sampling points, or, that after two years, 50% ground cover of low-growing vegetation will be achieved. This section of the rehabilitation plan has to provide people with a means of evaluating whether the work was done correctly, and in the longer term, whether the approach was effective. In the past, it has often been difficult to determine the reasons for success or failure either because the objectives were not spelled out clearly enough or because the degree to which the targets were actually met was unclear.

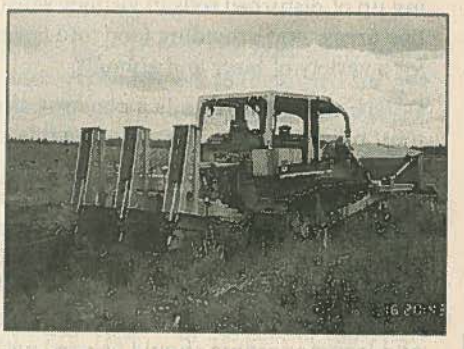
Figure 2. Diversion ditch above a fine-textured landing. Preventing excess water accumulation and runoff is an important part of rehabilitation projects.

Another important section of the rehabilitation plan provides details of treatments aimed at restoring water, soil and plants

Step 2. Restoring water

All rehabilitation plans must consider the need for techniques to restore above- and below-ground drainage patterns and slope stability, and prevent erosion. Figure 2 shows an example of a drainage diversion ditch installed to prevent water accumulation and runoff from a fine-textured landing on gently sloping ground. The need for cross ditches, pull back of unstable fills, stabilization of cut slopes, and clearing of debris from gullies or drainage channels depends on the characteristics of specific rehabilitation sites. Good drainage control and slope stabilization is required before further treatments to restore soil productivity can be carried out. Where surface erosion is a concern, grass and legume seeding should be carried out wherever mineral soil is exposed.

Figure 3. Tillage with a winged subsoiler. These implements are especially cost effective where relatively large areas (greater than .3 ha) require tillage.

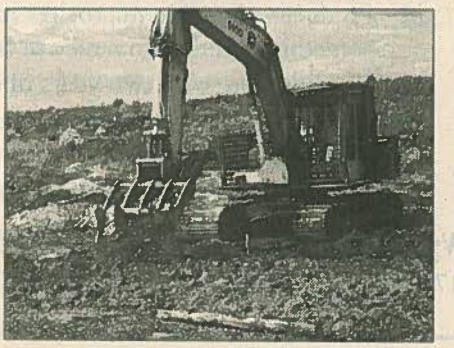


Step 3. Restoring soil

Alleviating growth-limiting conditions within the soil is often considered the main task for soil rehabilitation. Tillage is usually required to restore soil physical conditions and create a favourable environment for plant roots. On coarse-textured soils (sandy loam and coarser), tillage alone often produces substantial benefits. However, tillage of fine-textured soils (more than 30% clay content) should still be considered experimental.

Figure 3 shows a winged subsoiler decompacting a landing near Prince George. Winged subsoilers provide a particularly effective and cost-efficient method for projects involving tillage of large areas (approximately .3 ha and larger). Excavators are also used for tillage (Figure 4). Excavator tillage is more costly, but the costs are partly offset by the excavator's ability to perform multiple operations such as tillage, topsoil recovery, sidecast pullback, and creation or maintenance of drainage. Whatever implement is used, successful tillage requires that the operation coincide with periods of appropriate soil moisture content, particularly that the soil be dry enough to shatter, but not so dry that it turns to powder when tilled. Successful tillage requires that conditions be monitored during the operation (Figure 5).

Figure 4. Tillage with an excavator. These machines are widely available, and although the cost of tillage is substantially higher than for a winged subsoiler, excavators have the potential to carry out multiple tasks such as topsoil re-spreading, drainage control, and sidecast pullback.



Topsoil conservation and replacement is normally required during rehabilitation of temporary access. Topsoil has a more stable pore structure compared to subsoil material, and topsoil also contains more soil organic matter that enhances water retention and soil nutrient status. Topsoil replacement is especially important on medium- and fine-textured soils (loam texture or finer), where the beneficial effects of tillage alone may be short-lived due to unstable pore structures.

Figure 5. Evaluation of tillage. A simple steel probe can be pushed into the ground by hand to gain a quick impression of tillage effectiveness. The probe is also useful for evaluation of soil conditions during preparation of the rehabilitation plan and for subsequent follow-up.

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There are several options for handling topsoil, and the specific techniques used depend on site conditions such as recoverable amounts, slope, and presence of subsoil materials that may present an unfavorable growing medium for tree roots. For areas degraded in the past, topsoil piles are often present adjacent to roads and landings.

Figure 6. Five-year-old lodgepole pine on a landing tilled with a winged subsoiler. This coarse-textured soil responded well to tillage. Excellent penetration of a 1 m long steel probe is shown in the lower right corner.

Additional treatments can be considered for restoring soil productivity including the use of soil amendments, as well as mounding and other site preparation techniques. In all cases, success requires that the proposed treatment addresses specific growth-limiting conditions on the site.

Step 4. Restoring plants

In addition to providing future timber harvests, vegetation can be used to address many goals of rehabilitation, including stabilization of soil materials using bioengineering techniques, greening up of disturbed soils in visually sensitive areas, and providing food and cover for a variety of birds and animals.

Where erosion control is a concern, the most reliable means of controlling it is to revegetate the area immediately with mixtures of grasses and legumes. The appropriate seed mix should be determined in consultation with erosion-control specialists and range agrologists familiar with the area. Where cattle are grazing, grass and legume seeding should be used with caution because cows can damage tree seedlings. Rehabilitation in cattle country requires a thoughtful and imaginative approach to these potential problems. Seeding is probably not needed or desired on erosion-free sites where commercial tree production is the major goal.

The most common reforestation technique in the interior is planting lodgepole pine, although several other species including birch and spruce are currently being tested. For coastal BC, Douglas fir and Sitka spruce are suitable, and red alder occurs naturally on many disturbed areas. Where erosion is not a serious concern, planting alone is a low-cost and effective means for establishing a productive forest. Spreading stockpiled topsoil over the surface of the rehabilitated area encourages the establishment of native vegetation because topsoil contains a substantial seed bank of native species. Figure 6 shows a healthy stand of lodgepole pine growing on a rehabilitated landing.

Step 5. Follow-up and monitoring

Our ability to write good rehabilitation plans and carry out innovative, low-cost and effective treatments is still limited by a shortage of long-term information from rehabilitated sites where initial conditions and details of the treatments have been recorded, especially considering the wide variety of soil types and disturbance patterns in our forests. New research projects are being implemented to help answer some of these questions, but there is tremendous value in monitoring operational projects.

Simple monitoring approaches based on recording tree survival and vegetation composition, and establishing fixed photo points can help us learn from our mistakes and improve success.

Summary

All phases of the rehabilitation project need to be carried off successfully in order to restore a healthy forest. For successful soil rehabilitation:

1. *Develop a clear picture of the goals before setting out.* Rehabilitation in the past has

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Seedlings and symbiosis: Field trials reveal the benefits of certain fungi

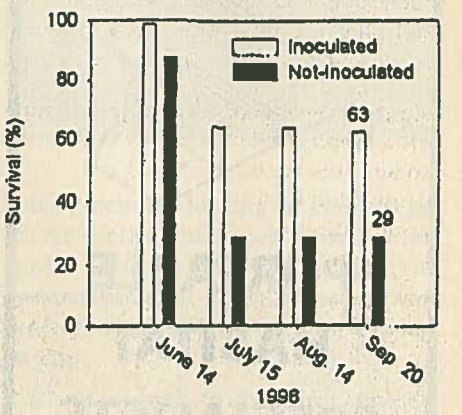
Mark Kean

Mycorrhizal fungi are abundant in most natural plant habitats. However, eroded, heavily worked or compacted sites, cutover areas, and commercial nursery-soil mixes are usually low in viable beneficial mycorrhizae, or lacking in the appropriate strain or species needed to support a new plant community.

There are thousands of species of mycorrhizal fungi, each of which forms a different symbiotic association with various plant species in particular habitats. The research community has carried out extensive studies to identify the most beneficial mycorrhizal and host plant associations with respect to increased survival and growth, nutrient uptake, drought tolerance, and pathogen resistance.

Older, mature trees have been shown to be infected by a different range of mycorrhizal species than are seedlings.

Some species of mycorrhizal fungi form mutually beneficial associations with a broad ranges of hosts, as in the case of most agricultural and deciduous plants. However, other species, such as those normally associated with conifer trees, have a more restricted host range. Mycorrhizal fungi occur in both tropical and temperate climates, but are not transferable between the two zones. This would suggest that a north-south movement of strains would not be as effective as an east-west movement between similar latitudes and climate zones. Therefore, for best field performance, it is important to match the targeted host plant not only to the appropriate mycorrhizal species, but to a specific, geographically adapted strain.



Survival during the first growing season for inoculated black spruce.

Over time, there is also a succession of the symbiotic association from "juvenile"

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had several meanings, including grass seeding landings to feed cattle, decompacting and planting pine to increase timber supply, and establishing permanent drainage structures on roads intended for occasional use.

2. *Concentrate on the easy jobs first.* Restoring productivity on coarse-textured soils is proven and effective. These sites likely will provide the best return on our investment.

3. *Make drainage and erosion control the first step.* If the site is unstable or suffering from erosion, subsequent investments will be wasted.

4. *Match tillage and revegetation techniques to the limiting conditions on the site.* Cookbook plans don't work beyond a narrow range of site types. A careful evaluation of the soil and site conditions is necessary before prescribing treatments.

5. *Keep records of the treatments and the results.* The range of possible techniques is expanding all the time. By keeping good records of the results, the success rates of rehabilitation work should improve rapidly, and investments in this work will provide the maximum possible benefit.

Chuck Bulmer is a soil restoration ecologist at the BC Ministry of Forests.

Résumé

La réhabilitation des sols pourra rétablir la productivité aux régions degradés par les pratiques forestières. Pour réussir a rtablir les sols il faut:

Faire attention aux régions les plus amenables a la réhabilitation.Pour rétablir la productivité aux sols grossiers est possible alors ces sols devrait recevoir le plus attention.

Commencer avec l'installation d'une système de drainage et contrôle d'erosion. S'il existe un problème avec l'instablité ou l'erosion du site, tout autres mesures de réhabilitation seront gaspiller.

Assurer que les techniques de revégétation sont compatible aux conditions

limitants du site. Un évaluation soigneux du sol et conditions du site soit necessaire avant de préscrire les traitements.

Noter les traitements et les résultats pour chaque traitement. En notant les résultats, les nombres de réussites pourra croitre.

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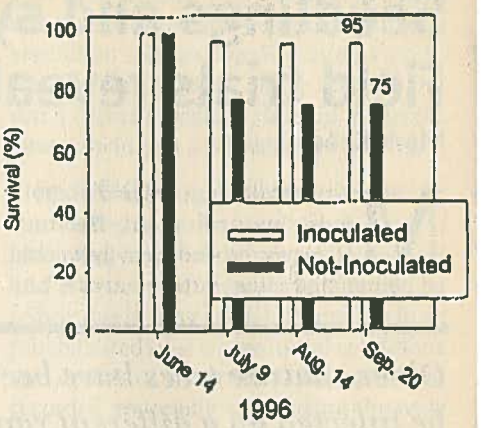
mycorrhizal species to "mature" species, as the seedling develops into a tree. Older, mature trees have been shown to be infected by a different range of mycorrhizal species than are seedlings. Since any natural infection on a cutover site is likely to be from "mature" mycorrhizal species, it is important to ensure that the most beneficial "juvenile" species and strain be established on the seedlings in the nursery, before exposure to mature or less beneficial species. For example, certain species of mycorrhizae have naturally adapted to survival in nursery conditions through abundant spore production, but have been shown to provide little or no benefit to the host plant.

To link the published data to practice, Mikro-Tek undertook a study, with funding from the National Research Council's IRAP program, to compare field performance of inoculated seedlings to that of non-inoculated seedlings. Six crops of the major commercial tree species of Northern Ontario (jack pine, black spruce, and white spruce) were grown in three different greenhouses, and inoculated with a mycorrhizal species chosen to provide optimal benefit to that specific crop. During 1995 and 1996, 17 different field trials were established over a range of forestry and reclamation sites.

Stem volumes of inoculated pine seedlings at three sites were 31 to 66% larger than those of non-inoculated seedlings after two growing seasons. Inoculated spruce seedlings at six sites were 2 to 30% larger in stem volume than non-inoculated seedlings after one growing season. Survival of inoculated black-spruce seedlings on an upland forestry site was 34% greater than that of non-inoculated seedlings (63 versus 29%,



Survival during the first growing season for inoculated white spruce.

respectively). Survival of inoculated white-spruce seedlings on the same upland site was 20% higher than non-inoculated seedlings (95 versus 75%, respectively). These field plots will continue to be assessed yearly in order to follow the seedlings to free-to-grow stage.

Mark Kean works with Mikro-Tek. For an in-depth report on these field trials, contact Mikro-Tek at PO Box 2120, 36 Emerald St., Timmins, ON, P4N 7X8; phone (705) 268-3536; fax (705) 268-7411; <mikrotek@onlink.net>.

Résumé

Des essais sur le terrain indiquent que certaines champignons mycorrhizal pourra croitre les volumes de tiges et réduire le taux de mortalité des semis d'épinettes noires et blanches. Cela démontre l'avantage des champignons pour l'hôte semis.

Sharing forest values

Wanson Hemphill

Most people reading this are already aware of some of the benefits that our public and private forests have to offer. But since healthy trees and forests offer so much more, we should be trying new and innovative methods of reaching that large untapped portion of the public who are unaware, misinformed or apathetic about improving our forests.

It is in the forest stakeholders' vested interests to reach Joe Public, and help educate, enlighten or at least reduce their apathy regarding the many treasures of the forest and the reasons for forest management, harvesting and reforestation. Failure to convince the voting public and decision-makers of the importance of our renewable resource and number one Canadian industry may come back in regulations, restrictions and reductions.

So how do we do it? Write it and they see, say it and they hear, but do it and they may understand. If much of our propaganda is written or spoken, then we are limiting ourselves. Instead, we should be more like salespersons selling our message using every available medium, hook and technology.

We must reach our next generation with forest-management information and facts— that includes school visits, curriculum, and getting classrooms into the forest. School contacts and regular two-way information exchanges would be helpful. Poster contests can be useful with younger students, and are a way of getting into schools. Contests need dedicated teachers, substantial prizes, and interesting, enjoyable challenges. Moreover, sponsors must tread the fine line of support without promotion, advertising or influence. And there may be more relevant challenges, opportunities and technologies available.

Joe O'Neill of Repap in New Brunswick has had considerable success bussing people out to harvest sites, feeding them box lunches, and explaining what people and machines are trying to do and why. Exhibitions, field days and demonstrations have been well attended and useful. We have to do more of these practical, hands-on, visual, informative and interesting events. We can't afford not to. Once every two years or only with federal money is not enough. Successful events can be pulled off on low budgets with a lot of planning, volunteers, motivation, and examples of local, appropriate technology at work.

Here are some other examples of getting the message across. Please use this list, add to it, and circulate it to forest educators.

• Guided tours of nature, wildlife, birds, plants, large trees, waterways, or anything else that can be done with a local expert.

• Demonstration woodlot tours. We have six fine self-guided woodlots, but not many people use them. Regular, scheduled guided tours have green-tourism and educational-impact potentials for local or visiting, aging baby-boomers looking for soft adventures.

• Value-added forest-products demonstrations, courses and workshops. Contests, entrepreneurial challenges, and promotions with good rewards are interesting, motivating, and may lead to local small businesses.

• Woodlot visits by offer or invitation. Walking in a woodlot with the owner and a family offering practical suggestions about how to improve their woodlot can encourage action and help owners understand and appreciate the value of their woodlots. Woodlot advisors, friends, and Master Woodlot Owner Programs are logical vehicles for transferring advice and information.

• Woodlot owner groups are the easiest way to reach numbers of people with a vested interest in forest improvement and values.

• Group slide presentations are an excellent, informative way to make forest values interesting to a variety of people.

P.E.I. FOREST IMPROVEMENT ASSOCIATION

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Ian Dennison, *President*
Wanson Hemphill,
General Manager

Many groups are looking for guest speakers for captive audiences. A well-developed presentation can help the understanding of forest issues and values— and may offer an opening for a forest tour.

It is not enough to meet in cohesive groups, mail out information, send canned press releases, avoid controversy, and hope public opinion will improve. It is time to be more proactive, creative and innovative in selling the message of forest stewardship, benefits and values.

***Wanson Hemphill** is manager of the PEI Forest Improvement Association.*

Contractor quits council

"It used to be a nice little industry, but I think they intend to cut every last tree and move on to the hardwoods," says John Doran. "We're taking too much and doing precious little to replace."

Doran has been a forestry contractor for 30 years. The respected member of PEI's Forestry Partnership Council resigned late May to protest what he calls an industry bound for disaster.

Doran says vested interests and economic greed have fueled panic over-cutting on PEI. He says the 160,000-cord harvest this year will be twice the sustainable level. Forestry officials claim 125,000 can be taken without damage. "The forest industry is wide open and government

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Tax reform for private woodland owners

Arthur Mathewson

Tax reforms said to promote the environmental stewardship of private forest land and conservation lands were announced this January by the Ontario government. Under the proposed changes, the Managed Forest Tax Rebate Program and the Conservation Land Tax Reduction Program will be replaced by a system that reduces the tax rate on eligible lands through the regular property tax process. These changes will also reduce the tax assessment on most of these lands.

The tax rate for eligible managed forest land will be set at 25% of the local residential rate, while there will be no tax on eligible conservation lands. Landowners will need to apply to eligible lands covered by the changes, and management plans will still be required for managed forests.

The minimum size of eligible land for forests is four hectares (about ten acres), and for conservation lands, 0.2 hectares (about half an acre).

The elimination of the rebate programs also means the elimination of any rebate recap. The new regime will also be available to conservation authorities, who are ineligible under the current rebate programs.

The Managed Forest Tax Rebate Program was designed to encourage private woodland owners to manage their properties for the long-term sustainability of the environment.

Introduced in 1975 (retroactive to the 1973 tax year), the Managed Forest Tax Rebate Program was designed to encourage private woodland owners to manage their properties for the long-term sustainability of the environment. The program provided a 75% rebate on property taxes for the managed portion of the qualifying property. The program was cancelled in 1993, but modified and reintroduced by the new government in 1996. The Conservation Land Tax Reduction Program was introduced for the 1987 tax year, and has been offered without interruption since then. This program offers a 100% rebate for qualifying lands.

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Grant Brodeur, *President*
John Lawrence, *Director*

Starting in the 1998 tax year, eligible managed forests and conservation lands will be assessed in a similar manner to farm lands, upon application by the landowner. Farmland in Ontario is assessed on the basis of current value in current use.

Résumé

Le gouvernement de l'Ontario vient d'annoncer les changements d'impôts viser a promouer l'intendance de l'environment sur les forêts privées et les terres de conservation. Sous les changements proposés, les anciens programmes d'impôts seront remplacés par un système viser a reduire le taux d'impôts sur les terres éligibles en utilisant le procesus d'impôt foncier regulier. Le taux d'impôt pour les forêts amenagés éligibles sera fixe a 25% du taux residentiel. Les terres de conservation éligibles n'auront aucun taux.

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is doing nothing to stop it. We need a harvest cap of 80,000 cords or everything is going to be taken."

Doran believes the government should provide tax incentives to woodlot owners to maintain healthy forests. "We need to have people put trees back in the ground. Tax breaks do funny things to people, who knows."

Reported by Canadian Press.

Résumé

Les intérêts devront découvrir des nouveax moyens créatifs pour engagé et instruire le grand public au sujet des valeurs du forêt. Des événements intressant(e)s multimedia soit nécessaires au lieu des brochures et communiques de presse . Quelques idées sont des tours organisés des forêts et des prsentations de diapositives.

John Doran, contracteur forestière pour plus que 30 années, vient de se démettre en proteste du Conseil de l'Association Forestière de l'Ile Prince Edouard. Doran dit que les intérêts et l'avarice poussent le niveau de coupe trop haute et que la coupe cet année sera double le niveau soutenable. Doran croît que le gouvernment devrait fournir un système de primes d'encouragement au proprietaires des régions boises pour maintenir des forêts sains.

"En forêt, la route, c'est bête!"

Pierre Dubois

Chaque année au Québec, les routes forestières font en moyenne 250 victimes, dont 20 décès. Grâce à une initiative concertée de plusieurs ministères et organismes publics, une campagne de sensibilisation se déroule présentement auprès du grand public et du personnel de l'industrie forestière. L'industrie forestière a en effet préparé quatre vidéos pour mieux former les camionneurs, les contremaîtres et les constructeurs de routes forestières. Enfin, la Sûreté du Québec pourra dorénavant y exercer un certain contrôle.

Il existe au Québec 12 827 kilomètres de routes forestières! Une grande partie des accidents y surviennent lors des périodes d'affluence correspondant à la saison de la pêche et de la chasse. On peut compter 28 millions de jours-personnes d'utilisation de ces routes et 700 000 voyages de bois pour approvisionner toutes les usines de sciage et de pâtes et papiers! "Le problème, c'est qu'aucun contrôle ne s'y exerce présentement," explique Gordon Perreault, responsable du dossier à la Commission de la santé et de la sécurité du travail (CSST).

Les routes forestières sont donc encombrées de vacanciers circulant au travers des fardiers et des camionnettes de travailleurs forestiers. Comme les camps forestiers sont beaucoup plus rares, ces derniers voyagent souvent au-delà d'une heure pour se rendre jusqu'au lieu de leur travail. Les vidéos serviront à sensibiliser et à former ceux qui travaillent en forêt afin de prévenir les accidents.

Par ailleurs, on lance cet été une campagne de sensibilisation de tous les utilisateurs des routes forestières, en les invitant à modérer leur transport et à adopter des comportements sécuritaires lorsqu'ils se rendent en forêt autant pour le travail que pour les loisirs. Les médias diffuseront des messages en ce sens au cours de l'été 1997 et des panneaux de sensibilisation seront installés sur les premiers kilomètres des routes forestières. Cette campagne est le fruit d'une collaboration entre les ministères de l'Environnement et de la Faune, des Ressources naturelles, des Transports, de la Société de l'assurance automobile du Québec et de la CSST. Le slogan retenu: "En forêt, la route, c'est bête."

Des exemples d'accident

À la fin d'août 1994, une femme, son fils et sa fille faisaient la cueillette des bleuets au nord du lac Saint-Jean, à proximité d'une route forestière. Au moment de retourner au camping, en traversant la route, l'automobile s'arrête à une intersection. La voie semble libre et la conductrice décide de traverser. Un petit camion ("pick-up") surgit en trombe et vient frapper l'automobile. L'automobile fit un tour complet, éjectant les trois occupants. La femme et son fils décèdent sur le coup. La vitesse excessive est à l'origine de l'accident.

Dans un autre accident, la victime est un camionneur qui se dirigeait avec une pleine charge de bois vers une usine de pâte et papier. Une collision est survenue avec un autre camion, libre de toute charge, circulant en sens inverse, au moment de traverser un pont d'une seule voie. Les camions chargés de bois ont toujours la priorité pour traverser ce genre de pont. Le camion vide a tenté de s'immobiliser mais son dérapage a provoqué l'accident, entraînant le décès du conducteur du camion chargé de bois.

À la suite d'une enquête sur ces décès, le coroner Pierre Trahan remettait son rapport en décembre 1996. Il recommande, "d'adopter une réglementation de façon à ce que certains articles du Code de la sécurité routière puissent s'appliquer sur les chemins forestiers, et à ce que les agents de la paix aient la possibilité d'intervenir dans le cadre de leurs fonctions." Les organismes publics qui ont une responsabilité de sécurité sur les routes forestières semblent donc vouloir intervenir. Il reste maintenant à espérer que les conducteurs redoubleront de prudence en empruntant les routes forestières du Québec.

Le visuel de la campagne (cela vous parviendra par la poste).

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Summary

Every year in Quebec at least 250 people are involved in accidents on logging roads. Several government and public organizations have recently launched a campaign to increase awareness of the dangers of driving on logging roads. The campaign involves educating both the general public and truck drivers about the potential dangers of using logging roads, particularly during the high-use fishing and hunting seasons. The campaign will educate truck drivers through instructional videos, and increase public awareness through commercials and signs along the first few kilometres of logging roads.

Contractors profit from "transient workforce"

D.C. Haggard

Recently, silvicultural contractors have launched a barrage of howling complaints about possible unionization of silvicultural work in BC.

No wonder! Most BC silvicultural contractors currently profit from the work of a transient workforce, which is denied job security, decent pay, a safe work environment, or standard benefits like health and welfare, or a pension plan. The silvicultural contractors are onto a good thing, and they want to scare their employees and public enough to allow them to keep it.

Few groups of workers have ever stood to gain more from unionization. Currently, for instance, silvicultural workers work only an average of 25 days a year, according to a study recently released by the silvicultural employers' association. They face an accident rate of 20 short-term disability claims per 100 person-years of employment, over one and half times the rate even for logging.

Just as they were when the *Vancouver Sun* investigated their lot in a 1991 article, employees of silvicultural contractors are typically "young students who plant for a month or two during the late spring or summer months," and who are subject to "some of the worst labour abuses" known to the provincial labour standards enforcers.

This situation has taken place because the employers have engaged in a downward bidding war that has progressively squeezed wages and forced continual pressure on workers' living and working standards. So when you hear contractors like Dirk Brinkman and the Western Silvicultural Contractors' Association attacking IWA Canada members while praising young people who "leap from stump to stump like gazelles," what you are really hearing is an exploitative employer fearful of unionization and running down the union.

Recently, this same employers' group has been working quietly to gain exemption from provisions of the BC Employment Standards Act governing overtime pay. Those young gazelles will apparently have to leap even longer each day to gain Mr. Brinkman's approval.

British Columbians should, therefore, disregard the shrill union-bashing of people like Mr. Brinkman and his friends. In spite of their "new age" rhetoric and "green-industry" image, these are simply old-fashioned bosses trying to hang onto the comfortable old way of manipulating a dependent labour force.

BC is in fact moving toward a new style of forestry in which there will be increased employment in all aspects of silviculture— tending and caring for our growing forests through treeplanting, thinning, pruning, spacing and other treatments through the life of the stand.

Until now, the silvicultural contractors have ensured that what little work there has been in this area has failed to offer job security, decent pay, or community stability.

It's about time this was corrected, and we hope the provincial government's forest jobs accord will help do that. We must do a better job of managing our new-growth forests, and we must get more jobs out of each unit of timber we harvest. This will help us to provide new, full-time work opportunities with good pay and benefits, and safer working conditions.

These new opportunities will benefit not only currently displaced forest workers but also a growing number of skilled silvicultural employees. We believe that it won't be long until the term "forest worker" covers silvicultural crews as much as it today covers loggers and millworkers— unionization will help bring these groups of workers together.

That's a promise that may strike fear into the hearts of silvicultural contractors.

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But we believe it will benefit British Columbians through better forest practices and secure job opportunities in forest-based communities. It will benefit silvicultural workers, who will enjoy a better standard of living and better working conditions.

In fact, silvicultural contractors might get a reprieve, since they will still control most of the "basic" treeplanting required by the Forest Act. But the existence of unionized, community-based crews in other areas of silviculture will likely help improve the lot of contractors' crews as well.

IWA Canada has offered to work cooperatively with the contractors' association to ensure better representation for their employees. Instead, the employers seem more prepared to fight IWA Canada than to work for the common good. That's too bad because while we look to a win-win situation for workers and the province, they look only to continued profit for themselves. We hope British Columbians agree the prospect of good, family-supporting jobs outweighs the value of easy money for a few contractors who have grown comfortable with the status quo.

D.C. Haggard is president of IWA Canada. This letter to the editor was sent June 13, and published in the North Island Gazette.

IWA claims willing to work with WSCA

D.C. Haggard

It has come to my attention that some members of the Western Silvicultural Contractors' Association have been making disparaging public comments about the BC government's forest jobs initiative and about the IWA's future role in the delivery of Forest Renewal BC-funded silviculture work.

I take considerable offence to these remarks as they both misrepresent the facts and do not contribute to a meaningful dialogue on issues concerning the future of the forest industry.

I would like to make it clear that the IWA is interested in better delivery of FRBC work so as to ensure secure jobs and stable BC communities. Regardless of opposition from the WSCA, the IWA intends to make sure that all forest workers receive fair wages and safe, decent working conditions. In my view, this means the unionization of the silviculture sector of the industry.

Unions can and do represent silviculture workers, and IWA loggers can and do plant trees. That is a simple fact. It is true that not all laid-off loggers want to take on this kind of work, but where they can they should have this opportunity. And how such workers fit in with existing silviculture workers in terms of employment and seniority is exactly the type of thing that our two organizations should be able to discuss and resolve.

In fact, IWA Canada has repeatedly expressed a willingness to work with WSCA to ensure that we can all share in the benefits of FRBC-funded silviculture work. A report prepared by WSCA seemed to indicate the same willingness by concluding: "The WSCA, in conjunction with the major stakeholders in forest industry and government, would like the government to announce a jobs program built on consensus about the structure of new land-based jobs."

I personally proposed such a partnership to the WSCA annual conference in February, and just one month ago on CBC "Early Edition", I publicly stated: "I don't see IWA workers replacing all the non-union sector... if the (silviculture contractors) want to be part of the equation, then they just have to wake up and be part of it."

Considering recent public comments, it does not appear that the WSCA is willing to wake up and unfortunately, if this is the case, you will inevitably be left out of the equation.

Time is running out if we are to have any meaningful dialogue on this issue. I sincerely hope the WSCA will decide to participate in meaningful dialogue rather than continuing to publicly denounce the IWA and the provincial government's forest jobs initiative.

DC Haggard, IWA president, wrote this letter to John Betts, WSCA Coordinator, June 12.

Contractor bashing, misinformation from IWA

Dirk Brinkman

I am not surprised the president of the IWA is misinformed about the silviculture industry. That is the fundamental reason he had to get the NDP to organize it for him.

The fact is, my employees are not transients. They have an average of 12 years experience. They have families and homes with mortgages in resource communities. Their wage averages above IWA rates. They work safely an average of a 110-day season (not 25 days). Loki Reforestation has paid IWA dues for 18 years for which workers have no benefits. Instead, they get disparaging remarks from the IWA. They do enjoy job security within our company, and in fact, the only job insecurity they face is the threat of losing their jobs to displaced IWA forest workers.

I wonder why Dave Haggard felt that contractor bashing was necessary when he had just been given all FRBC workers on a job-creation platter by the Premier. The IWA did not offer to work cooperatively at our conference. Instead, Mr. Haggard said, "those tents in the slash mean somebody else has our jobs."

Haggard is mistaken when he thinks I accept calls from reporters because I worry about my "easy living". This is the peoples' forest, and there are limited dollars with which to care for our trees. The Island Highway model in silviculture will at least double the cost per hectare because of the inflexibility of the regulations and the prioritizing of inexperienced workers over experienced.

Being in the business of adding value to forest stands, it would be irresponsible of me to sit by while the IWA and the provincial government doubled the cost per hectare. If only half the hectares are treated with limited dollars, only half the sustainable harvest jobs will be created.

In countries like Sweden where silviculture was union-organized in the past decade, higher costs have resulted in the mechanization of forest renewal work using commercial-thinning and treeplanting machines. The number of jobs in the forest sector in Sweden fell from 70,000 in 1972 to 26,000 in 1995.

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Goodwill arrangement with IWA, MB turns sour

Michael Mloszewski

"They're taking our jobs away, laid-off workers sue Greenpeace... more than 30 loggers are already out of work because of a blockade by Greenpeace. Their union is taking the eco-activist group to court for lost wages."

—The Province, *June 17*

Reading these words, I thought, how ironic that this union, IWA Canada, should be suing on behalf of their members for lost wages and benefits, when only weeks before they had locked out 30 non-unionized forestry workers. As a result, the treeplanters, employed by Heartwood Holdings Ltd. under contract to MacMillan Bloedel's (MB) Alberni West division, lost three to four weeks of peak season earnings with no recourse to compensation of any kind.

This spring, I was hired by Heartwood Holdings as a foreman, specifically to train fourteen IWA members facing prolonged layoffs due to snow conditions at the higher elevations they were to start logging. Heartwood's management suggested this training arrangement to MB as a gesture of good will and as a compromise to the Window 86 clause.

This clause, in the Coast Master agreement, states that the IWA may prohibit any contractor from working in an area where IWA members are unemployed for whatever reason, e.g., layoffs, weather conditions, snow levels, strikes, etc.— even if the service provided is one that the IWA workforce does not normally perform.

A week before the Alberni job was to start, I terminated my contract with Western Forest Products Ltd. of Port Alice, to spend some time with my family. Several days before start-up, I was notified we would be delayed. A week later, I was notified of a further delay, and in the third week of April, was told that the delay would continue until May 5.

As a spokesperson for the Silviculture Workers Association of BC, I entered a series of discussions with Larry Rylakowski, president of the Port Alberni IWA local. What started as a hopeful dialogue, seemingly aimed at solving a mutual problem (i.e., how to get our respective members to work), ended abruptly in a mysterious silence. Apparently, MB had told him that the blocks to be completed were still under snow, except in the areas where a five-man forestry crew was planting. Rylakowski was unaware that Heartwood had proposed the goodwill arrangement to MB and its IWA-unionized workers.

By the end of the first week in May, I learned that the MB forestry crew was being supplemented with laid-off IWA loggers. This crew eventually employed 30 workers, and by May 18, had planted approximately half the trees. On May 18, Heartwood was offered an opportunity to plant the remaining

Giving silviculture workers a voice

In the last decade, silviculture has diversified and become an integral component of BC's forestry practice, yet silviculture workers have no effective representation in either industry or government. The immediate goal of the Silviculture Workers Association of BC is to familiarize FRBC with the highly motivated, efficient silvicultural workforce that is already in place in the province and that is capable of meeting the challenges of this transitional phase in BC's forest industry.

Formed in the fall of 1996, the association's aims include identifying workers' needs, facilitating solutions, and representing the unique silvicultural workforce to industry and government. Employees in the silviculture industry are eligible to become members of SWABC. Membership is free, but a donation of $10 (to help offset the nominal costs of running the association) is appreciated. For more information, write to the SWABC at 607 Kokanee Ave., Nelson, BC, V1L 3P2 or call (250) 352-7878.

trees— five weeks after the contract was scheduled to begin and two days before their crews were committed to start in Meadow Creek and Golden. Heartwood was notified a day later that this offer had been retracted. MB destroyed the seedlings that were left some time later.

Due to scheduling problems and limited space on other projects, 40 Heartwood employees lost approximately four weeks of peak-season earnings between April 12 and May 18. Heartwood made every effort to place their workers with other contractors— but at least 25 of these could have been busy with the seedlings MB eventually destroyed.

Treeplanting, as those of us in the industry know so well, is intensive during peak lift periods from the nurseries. The planting window is limited to only a few weeks after the lift. There is no good reason why the Heartwood planters, who have worked in the Alberni West division for the last eight years, and the laid-off loggers couldn't have both gone to work, preventing a senseless waste of trees, time and money.

An experience such as this one creates factionalism in BC's forestry workplace, and casts doubt on the integrity and intentions of the IWA when it comes to implementing the silviculture program recently presented in the Jobs and Timber Accord.

Michael Mloszewski is spokesperson for the Silviculture Workers Association of BC.

A jobs accord around timber's neck

Dirk Brinkman

Relief from paper-processing costs for the Forest Practices Code (FPC) was the opening salvo of a sequence of media events called the Jobs and Timber Accord.

"A results-oriented Silviculture Prescription places greater emphasis on the judgment and accountability of professional foresters, " advised a June press release from the BC Ministry of Forests. Foresters who do not work in BC may have a hard time appreciating the paper process and attendant critical delays the forest industry in BC has experienced.

The requirement to reforest to a free-growing standard was introduced in 1988. Recently, the BC Ministry of Forests published a KPGM study, "Financial State of the Forest Industry and Delivered Wood Cost Drivers," which identified that, compared to 1992 before the FPC was introduced, the annual costs per cubic metre for establishing free-growing plantations had increased from $2.42/cu m. to $4.11/cu m. in 1996. In 1992, there were 79-million cubic metres harvested in BC, and in 1996, there were 69 million. In other words, between 1992 and 1996, the annual expenditure for establishing free-growing plantations on all areas harvested in BC grew from $191 million to $284 million.

Based on a survey of 94 operations across BC, foresters who responded to the study questionnaires ascribed these cost increases in order of priority to the following cost drivers:

1. New requirements and guidelines that became code (45%)

• having to include additional environmental factors in the operational plan of the Silviculture Prescription;

• the accommodation of these environmental factors in implementing the silviculture plans, including the additional paper work required for the approval of any, however minor, changes to the plan along the way;

• new free-growing requirements introduced with the FPC like spacing to reduce densities over the maximum to target densities; and

• more expensive mechanical site-preparation methods and equipment are required (especially in the North) for FPC soil conservation requirements.

2. Reduced cut block size (20%)

• moving to higher and more northern area with smaller commercial volumes per hectare, which therefore cost more to reforest per cubic metre; and

• smaller blocks dispersed over larger areas.

3. Price and rate increases (15%)

• these were supposedly intended, from the questionnaires, to reflect price increases from suppliers independent of the other code drivers— a difficult call to make.

4. Road and landing requirements (10%)

• reduced silviculture access due to increased levels of road deactivation; and

• not discussed in the report was the additional time required to reach the blocks each day, due to slowing down to drive through water bars and the stress costs to the vehicles.

5. Penalty risk management (10%)

• to reduce the risk posed by new FPC penalties for not meeting regeneration delay requirements, and to meet green-up faster so the adjacent block could be logged sooner, foresters also:

• increased the proportion of the areas planted;

• planted to higher densities; and

• used larger stock.

The recent results-oriented changes streamlining the FPC is intended to decrease, or at least slow, the annual increase in the costs per cubic metre for establishing free-growing stands.

Whether or not the cost per cubic metre logged will fall now depends on other factors as well. One factor arises from the additional requirement to thin stocking density to below a maximum in each ecosystem. This produces two results: the total annual reforestation expenditures increase with conifer release; and spacing costs (just before free growing) are added to the annual expenditures until the last blocks logged in 1988 reach free growing— which may not be until approximately 2008.

The change that allows the government to use FRBC to fund the reforestation of the Small Business Cut (about 20% of BC's total cut) may also increase the reforestation cost. This move is in direct violation of FRBC's original mandate that the funds never be used for any existing government programs or obligations.

When the trees cut under the Small Business Cut are tendered, the government promises not to sell the timber for less than the costs required to reforest the area. One of Premier Glen Clark's Forest Job Creation promises was to more than double the Small Business Cut.

By having FRBC fund the Small Business Cuts' reforestation, displaced forest workers and IWA crews will be required, potentially doubling the cost. If the reforestation cost is double, the minimum bid for small business timber will also double. Some of that cut is not tendered now because the bids are not high enough. Doubling the upset price will potentially reduce the Small Business Cut by more than half or, more likely, require further subsidies by government.

While that will not affect the forest industry that holds forest licences, it will increase the total cost per cubic metre spent on reforestation of the harvest area each year.

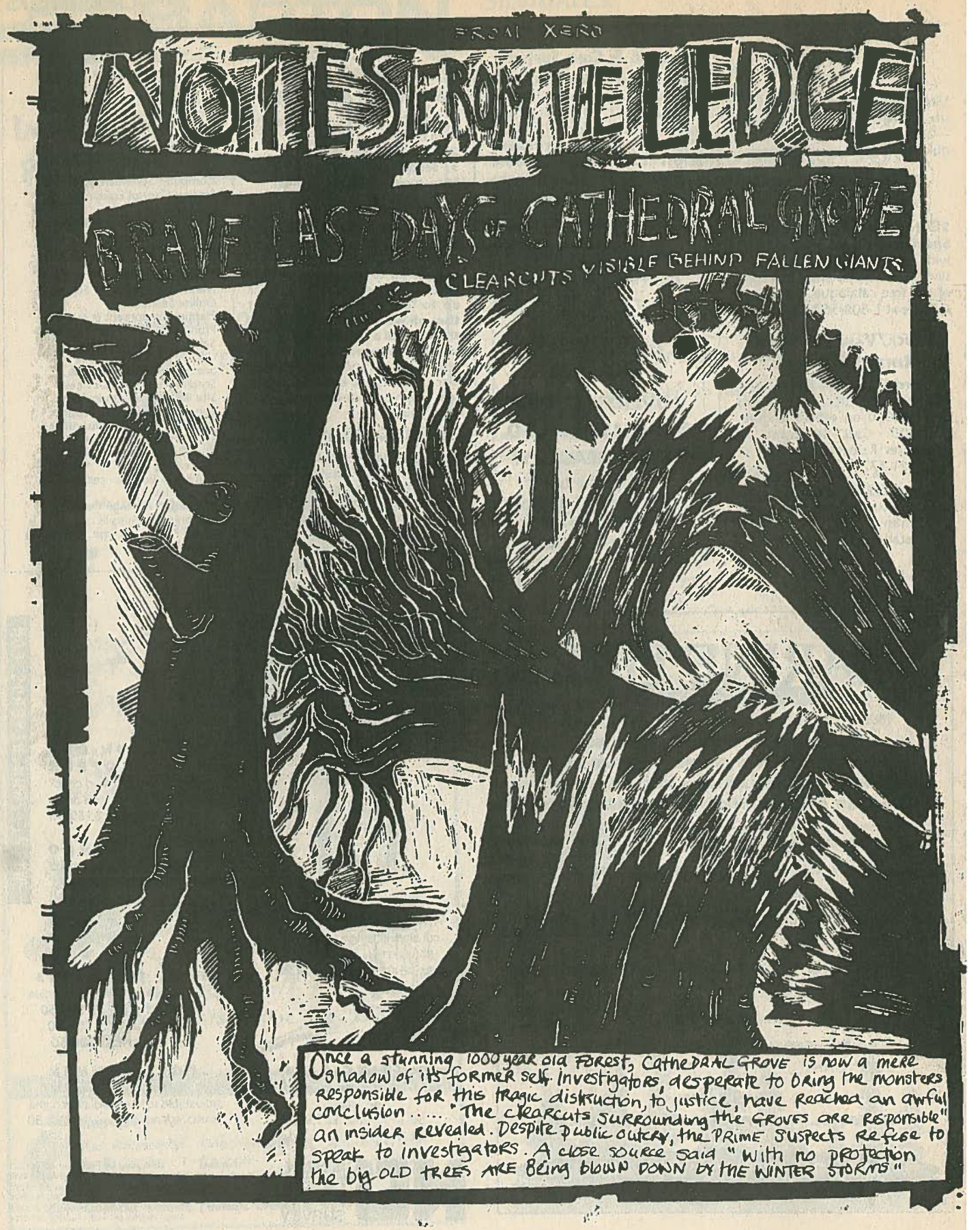
Not surprisingly, the forest industry did not squawk when the government raided FRBC funds to pay for the BCMOF annual reforestation program. Who knows? The forest companies might be next to get a handout from FRBC to cover the cost increase of the IWA on their reforestation programs. Why look a gift horse in the mouth— especially when he has a Jobs and Timber Accord around your neck, and timber is your life blood.

CONTINUED FROM PAGE 27

Pushing our industry towards mechanization will not create jobs.

The problem with the IWA is that they have never consulted the silviculture work crews to see what the workers really want. Behind Haggard's smiling face (at the right hand of Glen Clark) is the same Jurassic IWA. Unwilling to leave their comfortable old way of using politics to organize workers, they have been unable to represent the new generation of forest workers who have dedicated their careers to forest renewal and lead the way in creating small jobs.

Dirk Brinkman is CSM's editor and a silviculture contractor with Loki Reforestation Ltd. of New Westminster, BC. He wrote this letter in response to D.C. Haggard's letter to the editor. Both were published in the North Island Gazette.


FROM XERO
NOTES FROM THE LEDGE
BRAVE LAST DAYS OF CATHEDRAL GROVE
CLEARCUTS VISIBLE BEHIND FALLEN GIANTS
Once a stunning 1000 year old forest, CATHEDRAL GROVE is now a mere shadow of its former self. Investigators, desperate to bring the monsters responsible for this tragic distruction, to justice, have reached an awful conclusion ..... "The clearcuts surrounding the groves are responsible" an insider revealed. Despite public outcry, the prime suspects refuse to speak to investigators. A close source said "with no protection the big old trees are being blown down by the winter storms"