CANADIAN
SILVICULTURE
MAGAZINE

vol.4 no.2 SPRING 1996

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Nursery industry trends across Canada

Effects of rough handling on early seedling performance

Western silviculture conference round-up

plus regional silviculture reports

ON THE COVER
Nursery worker. Photo by M.Bolton.

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Canadian Silviculture Magazine is published quarterly by CSM Inc. It is available only by subscription. Opinions expressed by the authors do not necessarily represent the views of CSM Inc.
Printed in Canada by Van Press Printers
ISSN 1201-4079

CANADIAN SILVICULTURE MAGAZINE

Spring 1996, Volume 4/Number 2, Issue #11

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Canadian Silviculture Magazine
Box 65506, Station F
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The cycle of reforestation

Dirk Brinkman

What is happening to reforestation in the Maritimes?

From 1986 to 1996, the number of trees planted in the Maritime provinces ebbed by one third. In Middle Musquedobot, Nova Scotia, the best Swedish forest nursery equipment stands as a mute monument to how unaware that province's government was of the tides of forest renewal. We are not yet through ebb tide, and more Maritime government nurseries may be closed or privatized, and private nurseries may cut back production further.

Replace government inefficiency

On the surface, federal and provincial deficits explain the cancelled FRDAs. It is not without some satisfaction that we see the end of government inefficiency in the delivery of forest renewal programs, funded with inefficiently collected taxes or stumpage.

After two years of negotiations, PEI is close to an agreement with private landowners to fund reforestation of as much land as they harvest.

In BC and Alberta, the inefficient government reforestation program was replaced (1987 and 1991, respectively) by an industry regulation set to high ecosystem standards.

Maritimers are not taking long to come to such an agreement just because most of the land is privately owned. Getting cooperation among woodlot owners is no more difficult than getting agreement among voters. Higher unemployment in the Maritimes kept the government subsidy through FRDA in place longer, forcing Maritimers to deal with privatization later.

Oh, for the simple '80s

Getting voters to agree to reforest conifers was easier in the '80s than in the '90s. The blend of economic and ecological forces that once pulled the reforestation tides into the Western provinces in the late '80s, was confused in the early '90s in central Canada when images of monoculture plantations of pesticide-treated root-bound container seedlings were juxtaposed with the natural regeneration of diverse species.

When Ontario's "Surveys of Artificially Regenerated Sites (I & II)" were published, the fact that only 9% of the targeted (planted) conifers were present in today's plantations was whitewashed with the fact that these areas were 96% stocked with naturally regenerated species such as aspen, birch and balsam.

The confusing '90s

In Ontario in the early '90s, ecosystem concepts of species diversity delayed the Liberals, and then the NDP from transferring a clear responsibility to industry. Meanwhile, the government reforestation budget was cut. From its peak of 170 million seedlings, Ontario was down to under 100 million by 1995, with disastrous consequences for the nursery and reforestation industries.

The new Conservative government supports the arrangement of making industry responsible, which is increasing the size of the planting program. But the gutted government program's dependence on natural regeneration sets a precedent for industry in its negotiations for new stocking standards. The silviculture industry needs to watchdog the creation of these new standards.

HB, IB, PB, WB, & OSB

During the '90s, the economic reality of shifting capital investment in the forests also undermined the once simple vision for softwood forest renewal. Virtually all new capital investment in the forest sector in this decade has been for hardboard, insulation board, particle board, waferboard and oriented-strand board, as well as new pulp processes that use aspen, birch and balsam. These composite forest product mills quickly and profitably recovered their investment– so quickly that Ontario recently introduced a 50¢/cubic metre renewal stumpage.

The depletion of the higher-value climax conifers is the underlying cause of this shift in the species harvested. But the economic pattern matches the predominant pattern of the ecosystem as a cycle in which the seral species that come back first after a clearcut, are equally important in the balance of the cycle as later higher-value softwood species.

Mixedwood management costs less

From this new balance, a concept of ecologically driven mixedwood management is emerging that avoids "the costly and ecologically unsound attempt to suspend the forest in a single successional stage" (G. Blake MacDonald, "The case for boreal mixedwood management: An Ontario perspective," *Forestry Chronicle*, Nov.- Dec. 1995).

MacDonald summarizes the advantages that mixedwood stands have, including:

- greater resiliency – if one species is diseased, others dominate;
- improved nitrogen fixing and nutrient cycling;
- less biotic pest spread;
- more ready adaptation to partial cutting with its improved aesthetics (also stated as less clearcutting);
- enhanced diversity of wildlife;
- doubled yields through utilizing both species, and demonstrated increases in yields for individual species due to companion benefits;
- reduced per cubic metre harvesting and road-building costs;
- greater diversity in products;

and of course,

- lower regeneration and tending costs; and
- no herbicides to control hardwoods.

In the late '80s, Alberta recognized that harvesting without artificial regeneration resulted in its boreal forests converting from 70% softwoods and 30% hard-

woods to 30% softwoods and 70% hardwoods, with undesirable consequences for wildlife habitat. Today, Alberta forest managers recognize that despite major investments to control hardwoods on artificial softwood plantations, hardwoods are emerging and becoming a component of the regenerated stands and, in fact, softwoods grow better for that diversity. At the same time, hardwood mills are putting pressure to allow hardwood regeneration to become a component of the mixedwood stands. What was once seen as a problem, is now an optimum result.

The silviculture sector has to carefully participate in this debate.

Forest economists crying uncle

Predicting the future supply of various species in an ecosystem based on various strategies is possible. Predicting future demand for any of these species on the basis of today's usage is not as possible, especially when considering the historic pattern of substitution, new product development and the utilization of formerly ignored species. Consequently, some forest economists are now declaring they cannot project that there will be a return on investment in forest renewal. So, they have simply recommended that governments consider forest renewal as a social program, whose main value is creation of employment for youth, for forest-dependent and aboriginal communities, and for votes.

Sustainable syncromesh

These forest economists are ignoring two things: first, as described above, the synchronization of the ecological and economic wheels means cost reduction and increased harvest.

Second, the fact that more jobs are created when realizing the economic benefit of a silviculture intervention is undertaken by the most efficient operators.

Joyce Murray showed that result most clearly in her analysis of FRBC's current delivery program (see her article in the last issue of *CSM*). FRBC's vision is for a social program creating partnerships through job creation, which follows the non-silviculture path of the visionless economists, and does not prioritize quality or efficiency.

WSCA has to get in the new game

FRBC has over a billion dollars for silviculture, but it is not reaching the forests. Eastern silviculture contractors cry, "We should have such problems!" But WSCA contractors are angry after years of working to become efficient quality silviculturalists to see themselves bypassed by FRBC, which targets the employment of more well-organized lobby groups. Contractors have had to re-invent themselves as forest community trainers and lobby for change.

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Losing battles in the wrong war

For two years WSCA has been told by government and FRBC staff that because there is lots of money, it will eventually spill over to the silviculture contract sector. But the planned program cannot be delivered to a full level because of administrative bottlenecks. The expectations of many voters have been raised and disappointed due to a steady (and expensive) diet of TV, radio, newsprint and other media promises. The WSCA analyzed FRBC's strategy and showed it will create fewer jobs than if it had focused on delivering the optimum silviculture program through the most efficient operators. The analysis, however, fell on ears tuned only for the drop of an election writ. The WSCA has been fighting losing battles in the wrong war.

Move the goal posts

WSCA must request that the BC government move industry's free-growing goal post to the harvest stage – that is, make industry responsible for all phases of silviculture from regeneration through tending to harvesting. Through the Forest Practices Code, the maintenance of all other values is already an industry responsibility.

This inevitable step of including intensive values as part of industry's responsibilities would not only achieve efficient results, but would reduce forest management costs by allowing the rationalization of all phases of silviculture with environmental and harvesting responsibilities. This would accelerate the synchronization of the ecosystem and the market, and facilitate value-added and alternative harvesting techniques. It would also have the benefit of restoring silviculture work to those who are dedicated to it as a career, and are the most efficient and successful at it. This in turn would result in the soundest form of community stability, pride, and a sustainable economy and society.

Back to the original plan

When the WSCA lobbied for the Free Growing Standards in 1985 and 1986, it stated that this was a temporary goal post, which, after it was achieved, needed to be moved to the end of the full cycle. Actually, this goal post needs to be calibrated on all points of the ecosystem cycle, just as other values are reflected at all stages of the forest cycle in the Forest Practices Code. Moving the responsibilities of FRBC to the Forest Practices Code would simply add an Intensive Silviculture Manual (and eliminate an inefficient billion-dollar boondoggle).

The time to begin to visualize and actualize that next step for all of Canada is here, and must include responsibility for not just reforestation, but forest management as an integral harvesting cost. Government cannot afford to do it, and taxpayers and industry cannot afford to have government do it inefficiently.

Mixedwood management will not spell the end of the forest renewal industry, but may result in reduced regeneration costs and should allow the intensive management of the whole cycle to be affordable. There is a limit to the rent that can be taken out of forest products.

BC reforestation peaks

In 1997, BC expects to see a 20 to 25% reduction in planting due to reduced harvesting in 1995. The peak of 257 million seedlings planted in 1995 was reached by high harvest volumes in 1994, combined with companies' increasing anxiety to restock immediately and completely, and to maximize the sufficiently restocked forest on which their AAC is calculated.

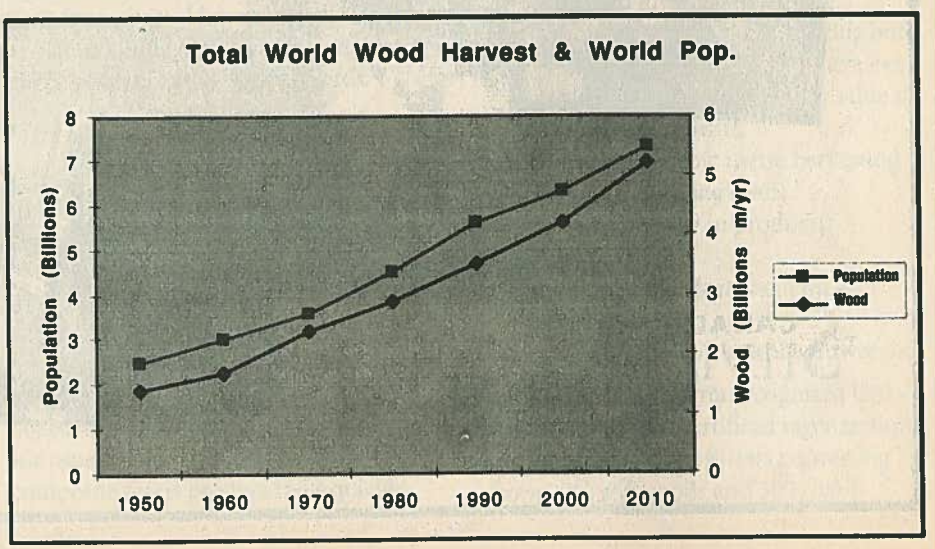
Fibre shortages will continue to drive investment in forest renewal and support those businesses, families and lives who depend on the reforestation industry.

Fibre demand still increasing

The historical parallel between wood harvest and population growth not only continues, but wood demand and price will increase due to population and per capita growth. As countries like those in Southeast Asia develop, the population growth slows, but the per capita wood consumption triples.

Over the past year, anticipated wood shortages drove the price of northern bleached softwood (coniferous) kraft pulp from US$390/ton in 1994 to over US$1,000/ton. BC's Council of Forest Industries predicts the softwood supply will shrink by 23% between 1987 (a peak year) and the year 2010.

The 35,000 to 50,000 people presently employed in silviculture will grow to over 100,000 in the next decades, without taxing the forest sector to support inefficient job creation. The competitive global market will not let us do anything short of the most cost-efficient and ecologically-effective job of sustainable forest management. That is the only way we can support Canada in continuing to meet the growing global demand for our high-value forest products. ❖



BC sets goal of 21,000 more forest sector jobs

BC Premier Glen Clark is setting a target of creating 21,000 more forest sector jobs in the next five years through a jobs and timber accord in partnership with the industry. Clark said the new jobs will come from better utilization of each tree harvested and new measures to further stimulate growth of BC's value-added wood manufacturing industry. Implementation of the strategy could include legislative changes to achieve the goal.

Forests Minister Dennis Streifel is being directed to forge the jobs and timber accord to achieve Clark's new forest jobs target. He will work with the Forest Sector Strategy Committee, a government and forest stakeholders partnership best known for successfully laying the groundwork for Forest Renewal BC.

The past five years have seen an increase from 1.2 to 1.4 jobs per thousand cubic metres, according to Streifel. The government is targeting 1.7 jobs per thousand cubic metres in the next five years — an increase that will mean 21,000 new jobs. In the longer run, this strategy targets two jobs per thousand cubic metres by the year 2005. Neighbouring jurisdictions, such as Washington and Oregon, get two jobs or more for every thousand cubic metres cut from their forests.

PEI forest partnership agreement

With the demise of PEI's FRDA agreement, the provincial government and the forest industry have hammered out a proposal for funding reforestation in the province. The Forest Renewal Partnership and Checkoff Proposal outlines a contract agreement for contributions by the province, and contractors and processors/shippers. A Partnership Council consisting of FIA directors and forestry managers would decide annual operating plans, rates and standards, and make necessary adjustments.

Highlights of the agreement include a two-year cap on contribution levels, a Renewal Trust Fund for any surpluses, input into the total Forestry Division Budget, and a commitment to a goal of re-establishing similar acreage of productive forests as is being cut. But the contribution of $1.50/cord each from contractors and processors/shippers is still being debated. The proposed implementation date is April 1, 1996.

RPFs increase in Ontario

For the first time in four years, the number of Ontario Registered Professional Foresters (RPFs) has increased. In 1995, new RPFs and reinstatements totalled 39 while resignations, transfers and deaths totalled 35, for a net increase of four. From 1991 to 1994, the total number of RPFs in Ontario decreased from 910 to 858 or a 6% drop. During the same period, the number of associate members (primarily forestry students and grads-in-training) declined precipitously by 36%, a troubling trend for the profession. Perhaps the stabilization of the RPF rolls signals a more positive future for the province's silviculture industry, which has seen the number of seedlings planted decrease by 40%.

Streifel new BC Minister of Forests

Dennis Streifel was appointed BC Minister of Forests on February 25, 1996. The fifty-year-old Streifel was first elected to the legislature in 1991, representing the riding of Mission-Kent. He has served as Parliamentary Secretary to the Minister of Skills, Training and Labour, and been on several select standing committees. Streifel was born in Vancouver, and now lives in Whonnock. He has worked for Weldwood of Canada and Safeway, and before the election, was a business agent for the United Food and Commercial Workers, Local 1518.

UI is history... welcome to EI

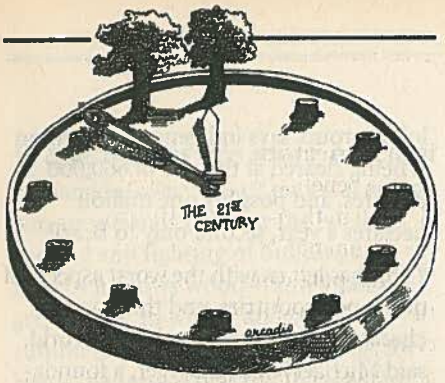
The UI changes that directly penalize seasonal workers will not be introduced in the current year. The proposal to reduce benefits by 1% for every 20 weeks claimed in the past five years to a maximum of 5%, is being delayed for "further public input." Other aspects of the UI changes, including the name change to employment insurance (EI) and, most significantly, the reduction of benefit levels and duration are proceeding for 1996. The shift from a weekly basis for insurable earnings to an hourly basis is scheduled for 1997.

BC community options for forests' visual quality

Forests Minister Dennis Streifel has announced that BC communities will have input into visual-quality standards that form part of logging plans. "This replaces the existing arbitrary standards and takes advantage of the beneficial effects of the Forest Practices Code," said Streifel. This policy's effects will be considered in setting allowable annual cuts for each timber supply area and tree farm licence. The key is to ensure an appropriate balance between protecting visual resources and minimizing the impact of protection measures on timber supplies and jobs, said Streifel. "These decisions will benefit from local community input. "

Wither the Canadian Forest Service?

The 1994 Liberal budget cut the funding of the Canadian Forest Service (CFS) by more than 50%. This has already led to the closure of regional offices, research facilities and will result in the laying off of one-third of CFS staff. But is the end in sight? Not the end of the cuts, but perhaps the end of the CFS. The "unity package" Jean Chretien outlined in his first post-referendum throne speech includes more decentralization. Specifically, the federal government is planning to completely get out of areas of "provincial responsibility" including natural resources. Does this spell the end of the Canadian Forest Service, another once-proud national institution? ❖



The world definitely is a warmer place to live

Last year, the world as a whole experienced the warmest year since reliable records began. With 11 months' data gathered from every continent and ocean, British climate experts are confident 1995 will emerge as the hottest in the last 140 years. This adds appreciably to the growing weight of evidence that pollution is detectably altering the Earth's climate.

The 10 warmest years since 1860 have been since 1982, and the top four places all belong to the 1990s, according to the Meteorological Office's Hadley Centre and the University of East Anglia.

Meteorologists have confirmed that from January to November 1995, temperatures around the planet were on average 0.41°C above the long-term averages for the 30 years between 1961 and 1990. The current record-holder is 1990, for which the "anomaly"— the departure from the 1961-90 average— is 0.36°C.

Environment Canada says British Columbia has also enjoyed one of the warmest years on record. With estimates for December factored in, the average temperature in Vancouver was 10.9°C, making 1995 the fourth-warmest year since 1936.

Government climate scientists from around the world have now advised politicians that man-made climate shifts are already under way. "The balance of evidence suggests a discernible human influence on global climate," they concluded at a United Nations' meeting in Madrid last year.

The warming is predicted to accelerate gradually through the next century, with temperature rises faster than any since the last Ice Age ended 10,000 years ago. The cause is the billions of tonnes of carbon dioxide and the heat-trapping "greenhouse gases" poured into the atmosphere each year, mostly from the burning of fossil fuels and forests.

By 1860, enough temperature readings were taken all over the planet's land surface and seas to begin a comprehensive global record — only the Antarctic and extreme Arctic were missing by then. Before that, temperatures have to be inferred from a variety of sources that offer much poorer global coverage — tree growth rings, the number of days for which rivers were ice-covered, the length of glaciers, and the ratio of isotopes of common gases trapped in bubbles within Arctic and Antarctic ices.

Vancouver Sun/The Independent

Canada's forest biomass is shrinking

The northern Canadian forest has lost a fifth of its living matter in the past 25 years, a new study suggests. The decline is mainly due to a rise in fires and insect infestations, says the study by Michael Apps of the Canadian Forest Service and Werner Kurz of ESSA Technologies in Vancouver. Harvesting has also increased, but is a much smaller factor than natural disturbances in the loss of plant life, the study concludes. Kurz suggested that climate warming might be one reason for the increased rate of natural disturbances. Warmer average temperatures favour both insect infestations and fires.

The total biomass — living plants — in the northern Canadian forest declined to 7.1 billion tonnes in 1990 from 8.7 billion tonnes in 1970, the study concludes. That's a loss of 18% in the total volume of plants and trees in the northern boreal forest, Canada's largest ecosystem. The area of forest disturbed annually more than doubled in the period from 1970 to 1990, compared with the period 1920 to 1970.

The researchers' most disturbing finding is that rising damage from insects and fire has converted the Canadian forest from a carbon "sink" to a carbon source in recent years. As plants grow, they absorb carbon from the atmosphere. When they die, they release it to the soil, from which it returns to the atmosphere. For a large ecosystem like the northern forest, the amounts involved are huge. When carbon is released to the atmosphere, it is transformed into carbon dioxide, a major cause of global warming.

Between 1920 and 1979, the Canadian forest absorbed on average 147 million tonnes of carbon per year, the study says. But from 1980 to 1990, the forest released 57 million tonnes of carbon, adding to Canada's emissions from fossil fuels.

Forestry Chronicle/Montreal Gazette

Scientists confirm that rainforests clean the air

Scientists working in Brazil have found the first proof that undisturbed tropical rainforests soak up huge amounts of the carbon dioxide that people produce by burning fuels. The measurements show the southwestern portion of the Amazon rainforest absorbs one tonne of carbon dioxide for every hectare of forest every year.

"Virgin forest sequesters carbon from the atmosphere," wrote the University of Edinburgh's John Grace, who led a team of ecologists from the United Kingdom, Australia and Brazil. "The whole of tropical South America may act as a carbon sink."

Extend Grace's measurements globally and the world's remaining tropical rainforests could be absorbing a billion tonnes of carbon dioxide every year — one-sixth of the amount produced annually by burning fuels, said Pieter Tans of the National Oceanic and Atmospheric Administration.

"It's a pretty important finding," Tans said. "It's clear the forests are helping us balance the greenhouse effect."

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The carbon-dioxide content of the atmosphere has been rising slowly for decades. Today, it is 30% higher than at the turn of the century, Tans said. Much of this increase is attributed to burning fuels, and cutting down and burning forests.

Many scientists believe increased carbon dioxide could cause a global temperature increase known as the greenhouse effect, where the gas molecules prevent the sun's heat from being reflected back into space. That could cause gradual changes in the climate, sea level and rainfall, which some experts believe is already occurring.

The oceans are the world's largest absorber of excess carbon dioxide, and Tans discovered last summer that newly growing forests in the northern hemisphere also act as large carbon sinks. That's because plants "breathe" carbon dioxide, using the gas to switch on the photosynthesis that lets them grow and multiply. So as atmospheric carbon dioxide has increased, some young forests have responded vigorously to the gas as a sort of fertilizer.

Forestry Chronicle/Montreal Gazette

Australia gases emission targets

Australia is cutting down forests at a rate second only to Brazil, and despite being one of the worst producers of greenhouse gases, has abandoned targets to reduce emissions by 2000. In 1992, Australia's emission of greenhouse gases, per unit of GDP, was almost twice as high as the US and Canada — two "high-emission" economies — and the ratio is expected to get worse.

While economic and population growths have played a part, the overwhelming cause is the relentless clearing of land for farming, forestry and coastal development. The Australian Conservation Foundation, the leading environmental lobby group, says indigenous vegetation is being cleared at the rate of 660,000 hectares, and possibly one million hectares a year, second only to Brazil.

"This has left us with the worst aspects of developed countries, and the worst characteristics of the developing world," said Michael Krockenberger, a foundation forestry official. "The clearing has an impact not only on animals and plants, but also on the climate." South Australia is the only state with tough laws against clearing. Elsewhere, state governments turn a blind eye for fear of alienating powerful farming and forestry lobbies.

Meanwhile, after pressure from industry, Canberra has backed down over imposing a "carbon tax". The Labor government headed by Paul Keating announced it would drop plans to impose a tax on emitted carbon dioxide and use part of the revenue to promote greater energy efficiency.

Vancouver Sun/The Independent

Wood houses are more efficient

In Canada, over 30% of national energy consumption is used for the heating, cooling and lighting of buildings. Research shows wood-framed houses are warmer in winter and cooler in summer, leading to energy savings for home owners. Wood has the greatest thermal resistance, or R-value, of common framing materials. The unique cellular structure of wood traps air, giving it naturally superior insulating properties. Recent studies by Canada's National Research Council, and the US National Association of Home Builders Research Centre, have confirmed that steel studs lower the R-value of walls by as much as 50%.

To compensate for the heat loss in steel framing, the National Energy Code of Canada requires a 2x6 steel-framed wall to have two inches of extra rigid insulation, called foam sheathing. But American thermographic testing of full scale steel-framed houses shows that even with foam sheathing, heat travels down through the steel to the foundation and up to the roof, significantly reducing the overall thermal efficiency of the house.
Canadian Wood Council

Ozone thinner than ever

The ozone layer over nearly one-third of the northern hemisphere (including the sub-Arctic areas of Greenland, Scandinavia, Britain, Iceland and Western Siberia), was at 45% of normal levels this winter. The winter levels of ultraviolet radiation are expected to increase even more in future years, with increasing concentrations of chlorine and bromine combining with the cold high-altitude temperatures to further deplete the ozone.

These unprecedented decreased levels of ozone are a warning that planters and other silviculture workers who work in the open should take more seriously the risks of exposure to increased levels of ultraviolet in 1996. Skin cancers and damaged immune systems are two of the well-known risks.

Under the 1987 Montreal Protocol, countries are phasing out production of ozone-destroying chemicals so that, by 1998, according to a UN report, atmospheric levels of CFCs will start to drop. If nations cooperate with the protocol, the ozone layer will recover fully sometime in the middle of the coming century.

These next fifty five years pose not only a personal risk for two generations of forest.workers, they also pose a major forest management challenge to two generations of foresters and ecologists.
Vancouver Province/CSA ❖

If you have a new product or publication that you would like listed, please send information to: CSM, Box 65506, Station F, Vancouver, BC, V5N 5K7.

Stihl introduces "no tools" chain adjustment

Stihl introduces another innovation in chain saw technology— the exclusive Quick Chain Adjuster. It allows finger-tip tensioning of saw chain without the use of any tools. The operator simply shuts off the saw, pulls open the large lever (marked "A") and turns. The operator then uses his or her thumb to adjust the chain tension by moving the adjustment wheel (marked "B") and re-tightens the large lever. This is an optional accessory now available for the 017, 021, 023 and 025 chain saws. In a matter of minutes, the Stihl Quick Chain Adjuster can be adapted to your chain saw for only $32.95. *Contact Stihl at (519) 681-3000.*

The new PLUS Series from Stihl

Stihl has introduced the PLUS Series, a more powerful line of outdoor power equipment designed for those who demand professional performance. The PLUS Series offers 15% more power, increased torque and improved performance on a wide range of Stihl products including trimmers, brush-cutters, and edgers. Stihl guarantees satisfaction on the PLUS Series power tools with a seven-day money-back offer. *Contact Stihl at (519) 681-3000.*

Inchworm processor

The Inchworm processor is a computerized stroke delimber that limbs well, measures exactly, and cuts at the rate of three to five cords/hour. It also cuts and limbs hardwood (reasonably straight) because of its terrific limbing force— and is a fraction of the cost of other models.

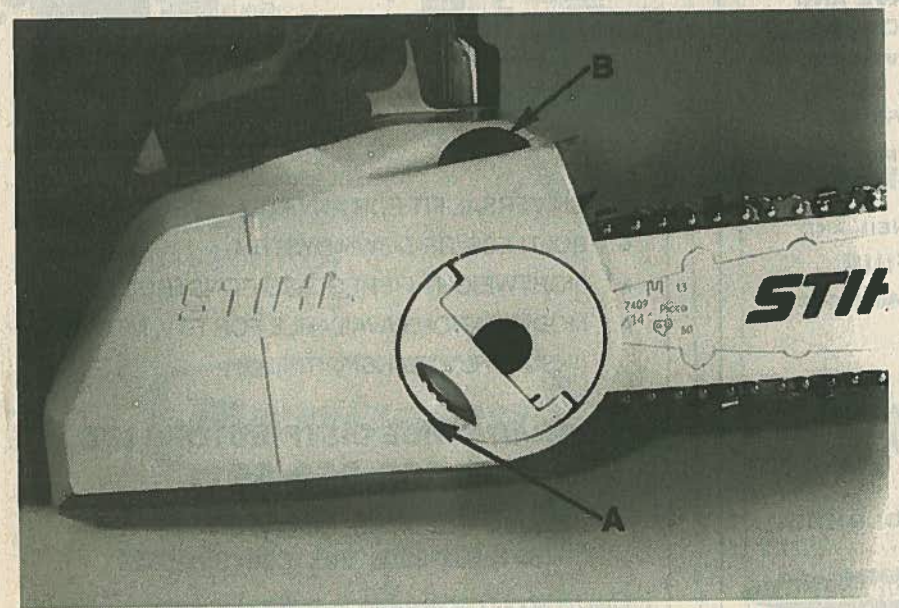
The Inchworm is very user friendly— the computer will do most of the work. All the operator has to do is load it. The processor can cut tops to any size by setting a sensor, and do multiple stems.

This shortwood processor can be put on a forwarder or a half-ton truck in less than an hour, and can be removed in a few minutes. The Inchworm can be put on a double-racked porter. If the Inchworm is located on the front section, you can load the back half with wood and forward it to the road.

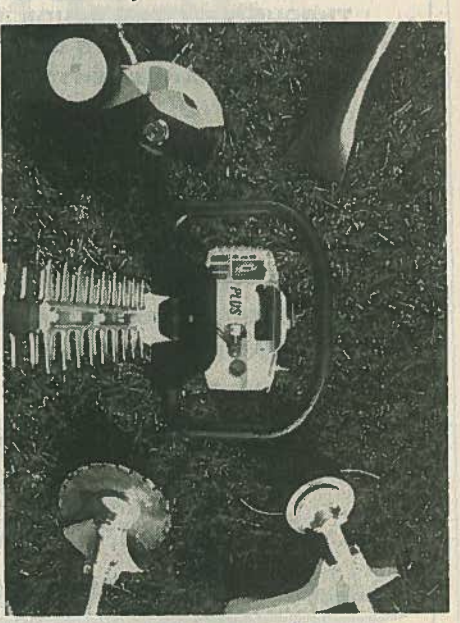
The Inchworm is very durable, built in New Brunswick by experienced crafts-people at Sunny Corner Enterprises. Weighing approximately 1500 pounds, it is powered hydrostatically— 30gpm to 50gpm or 2500 psi to 3000 psi. Its stroke delimber has four tons of limbing force and can be enhanced to 14 tons. *Contact Al Kingston by e-mail at redpine@NBNET.NB.CA or by phone at 1-800-561-4459.*

WX35O Roadbuilder

Wajax Industries Limited is proud to introduce its newest Hitachi Roadbuilder, the WX350. This excavator offers the speed and manoeuvrability of the 300 series excavators, with the increased life and power advantages of the 400 series undercarriage. The WX350 is powered by an Isuzu 6SDl TPD engine with 208 horse power at 2000 RPM. The upper-house guarding features a FOPS rubber-mounted cab guard, with window guards and heavy duty underhouse guarding. The undercarriage has quality Hitachi FX400 undercarriage components, with 30-inch ground clearance, and rests on Intertrac 28-inch double-grouser track-pads with eight lower rollers and two double-pedestal upper rollers. The front end comes with a 21-foot boom and 10-foot, six-inch arm with a Wajax quick coupler and hydraulic thumb. The arm has a maximum reach of 36 feet, with a below grade reach of 22 feet, six inches. *Contact Wajax at (604) 946-1171.*



Stihl's Quick Chain Adjuster provides tensioning of saw chain without tools.



Stihl's Plus tools have 15% more power.

Tree pillow enhances thinning efficiency and safety

When carrying out early commercial thinning, silviworkers often use a bench-felling technique to facilitate limbing and processing. Trees are felled on cross trees that keep the felled trees up off the ground. While this technique can be effective, setting up the bench trees is time consuming, and sometimes a well-placed bench tree is not available.

Jim Saunders, a New Brunswick consulting forester, has developed an elegantly simple solution called the "tree pillow". It is a rubber tube about 40 inches long and 12 inches wide, filled with compressed air. The tube is protected by a canvas cover, and is very light and easy to carry.

To use the tree pillow, a cutter limbs the tree to shoulder height and notches it for the cut. Next, he places the tree pillow in the path of the tree, about three feet from the stump. He then makes the felling cut, leaving a good hinge, and the tree falls on the tree pillow, which props it up, normally at an angle of about 25 degrees. The cutter then proceeds to limb the tree and buck it into suitable lengths.

The tree pillow holds the tree up off the ground at a convenient height for limbing with a chainsaw. This speeds up limbing and increases overall efficiency. It also eliminates the problems associated with limbing trees that are lying on the ground.

These include bending over while operating a chainsaw, which reduces productivity, and is hard on a cutter's back, often causing strain and injury, and working the saw near the feet, which also increases the risk of injury. The risk of striking a rock with the saw during limbing and especially when bucking the stern is also eliminated. Experienced cutters are too familiar with these hazards.

The tree pillow is designed for use with trees up to about eight inches in diameter at chest height, but it can be used with trees up to about 12 inches in diameter. *Contact Jim Saunders at (506) 773-4279.*

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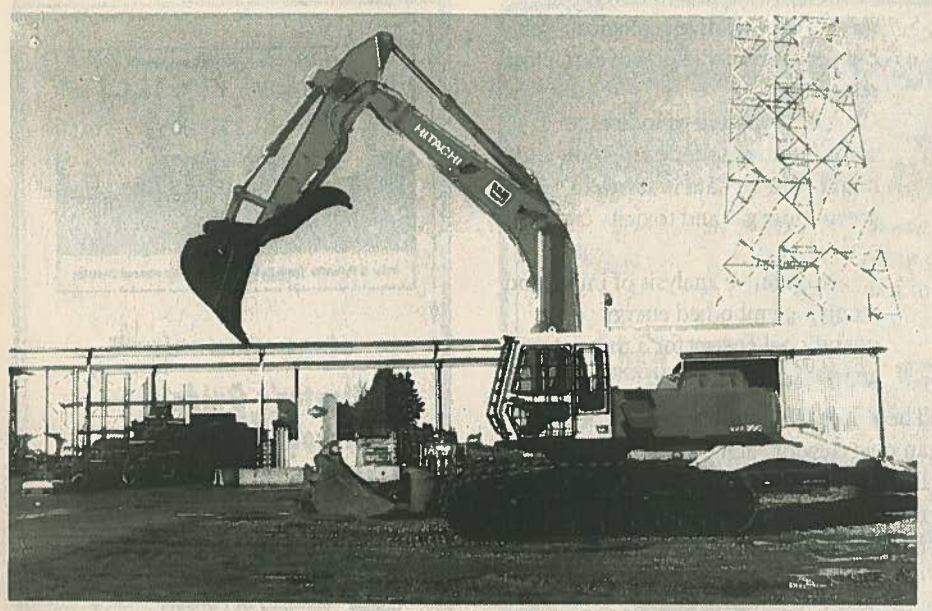


WX350 Roadbuilder has a maximum reach of 36 feet.

New publications

FERIC Compendium of Commercial Thinning

To meet the increasing demand for material on commercial thinning, FERIC has been assembling information on commercial thinning operations, describing who did what, where, when, why, and how. Operations in western Canada, the Pacific Northwest and other jurisdictions are described. Details on equipment including prices, distributors and availability are presented. Site type, limiting factors and operational observations are also discussed. A printed version of the compendium is now available, and updates will be published on a regular basis. The 1995/96 portion of the study has been funded by Forest Renewal BC.

The compendium is organized into two sections: Operations and Equipment. Each is further subdivided into harvesting system and equipment type categories, respectively. Articles in the Operations section are developed from a variety of sources: summaries of FERIC reports, short-term productivity studies, field visits, and telephone contacts. The objective is to describe the key features and parameters of the operation. The reader is then referred to contacts for further details and critical comment.

The Equipment section focuses on identifying equipment that may be suitable for commercial thinning operations. The equipment may be in use currently for thinning, and/or may be available locally, or it may simply have potential in commercial thinning applications. Information on equipment specifications, manufacturer, distributor and cost (if available) will be included. In most cases, equipment distributors can identify new or local purchasers to any interested persons.

The binder format allows the reader to insert other information as well, to supplement that provided as part of the compendium. *Contact FERIC at (604) 228-1555 or fax (604) 228-0999.*

The Sustainable Construction Materials Project

"The Sustainable Construction Materials Project, Phase III" reports are now available.

Analysis of the relative environmental impacts of various building materials has been extended by the alliance of private, public and university researchers organized by Forintek Canada and supported by Natural Resources Canada. While Phase II concentrated on compiling life-cycle inventory data on materials, much of Phase III has been dedicated to impact analysis measures and methods.

The ultimate project objective is to develop a systems model that will allow building designers, researchers and policy analysts to readily assess the relative life cycle environmental impacts of using concrete, steel and wood building materials in low-rise structural applications.

Phase III reports deal with:

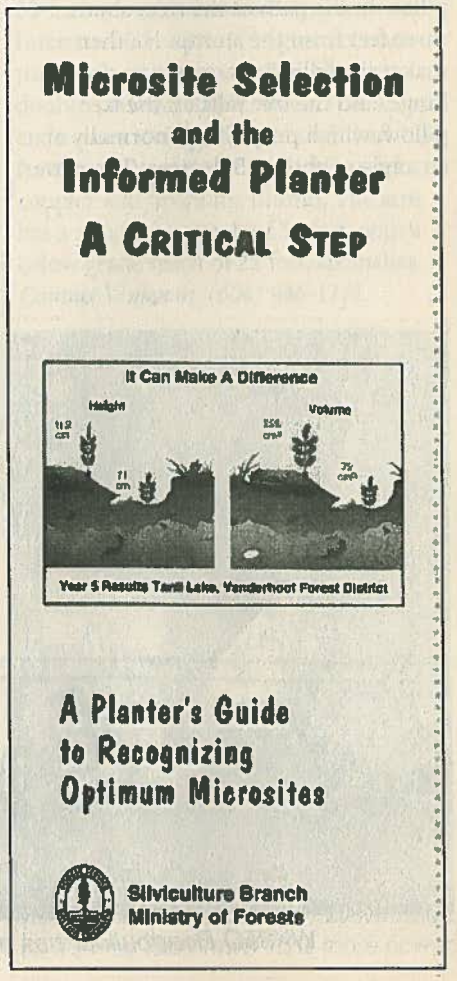
- Environmental effects of producing steel building products with mini-mills;
- Further assessment of demolition and disposal issues for structural building materials;
- A survey of experts to develop measures of relative ecological-carrying capacity effects of extracting resources;
- The development of indices to combine atmospheric emission and liquid effluent data in terms of greenhouse gas and toxicity criteria; and
- A comparative analysis of initial and recurring embodied energy of operational energy for a three-storey generic office building.

The Phase III summary report provides an overview of each of the other five Phase III reports, and serves as a useful roadmap to the complete set. *Contact Forintek by fax at (604) 222-5690 or e-mail phyllis@van.forintek.ca.*

Microsite Selection and the Informed Planter

BC's Ministry of Forests has released an information pamphlet, "Microsite Selection and the Informed Planter – A Planter's Guide to Recognising Optimum Microsites," available in English, Punjabi and French. This guide explains what a microsite is, and how microsite planting can be used to offset different site-limiting factors. The importance of microsite planting on mechanically prepared areas is emphasized.

The pamphlet should be a useful tool for planting contract administrators and planting contractors seeking to overcome language-communication difficulties sometimes encountered in planting programs. *For copies or other reforestation resource materials, contact BC MOF at (604) 387-8903.*❖



BC MOF does recognize and encourage commercial thinning

Dear Editor:

I am writing in response to your editorial in the Winter 1996 issue of *Canadian Silviculture Magazine.*

In the sixth paragraph on page 6, you state that the "BC Silviculture Branch does not consider commercial thinning to be a silviculture practice." That is incorrect. The BC MOF recognizes and encourages commercial thinning. It is Ministry of Forests policy that commercial thinning will be used to provide a proportion of the Provincial Allowable Annual Cut. This policy clearly shows that we are very keen on such general benefits as flexibility in timber flow, and improving environmental, economic and social values.

The following strategic objectives may be achieved by commercial thinning:

- maintain or enhance wildlife habitat or other important non-timber values;
- provide local employment;
- improve forest health;
- increase stand value; and
- maintain, increase, or change timing of timber availability.

Commercial thinning in appropriate ecosystems and forest cover types will allow both timber and non-timber resource values to be managed for, simultaneously. This is an option that is very desirable, and that the Ministry of Forests is seeking to encourage.

Achieving these objectives can be promoted by improvements in the types of equipment used and the techniques implemented in commercial thinning. BC entrepreneurs have always risen to the challenges of harvesting in the past, and we hope that they will take advantage of the opportunities in this expanding field with more innovations. While this benefits the entrepreneur, it also meets the objectives listed above and benefits everyone.

The *Silviculture Manual* has had a section on commercial thinning for many years. Also the Ministry of Forests is currently in the process of preparing a guidebook about commercial thinning as part of the Forest Practices Code of British Columbia.

As a result of the Forest Practices Code, it is expected that the proportion of the volume harvested in BC from commercial thinning will increase. It is an opportunity to harvest in areas that might not otherwise be available due to rules such as adjacency, green-up and visual-quality objectives. This flexibility has an impact on timber flow by providing wood flow when wood is not otherwise available in sufficient quantity.

Levels of commercial thinning are anticipated to increase significantly due to current and predicted timber shortages. Within 10 years, commercial thinning is anticipated to account for 10 to 15% of the BC annual harvest volume.

The volume harvested annually has been increasing. Despite the challenges, we are confident that over the next few years, the volume harvested in the province by commercial thinning will continue to increase.

Mel Scott, Commercial Thinning Fertilization Specialist, Silviculture Practices Branch, BC MOF ❖

Effects of rough handling on early seedling performance

Ipi Yuyitung, James A. Simpson, and Andrew M. Gordon, Department of Environmental Biology, University of Guelph

Note: This is an edited version of an article from the US Forest Service publication Tree Planters' Notes *(vol. 45, no. 4), reprinted with the authors' permission. Address correspondence to A. M. Gordon, Department of Environmental Biology, University of Guelph, Guelph, ON, N1G 2W1.*

The Canadian forest industry harvested 162 million m^3 of wood in 1993, but only 500,000 ha were replanted. The need to maximize survival of outplanted seedlings is underscored by these figures. To increase seedling survival, individual seedlings must be healthy and robust prior to planting. Historical studies have investigated obvious factors affecting seedling health (such as lifting date, or soil temperature), but only a few studies have dealt with damage during seedling transport.

...water is obviously important to plants under stress, especially when seedlings are newly transplanted...

These studies suggest that careless handling may have a detrimental effect on seedling growth. In a study of the effect of dropping seedlings 135 times from heights of 0.1 m, 1 m, and 3 m, results showed that Sitka spruce seedlings had lower survival rates as dropping distance increased. One report indicated that dropping Sitka spruce and Douglas fir seedlings from 3 m was as damaging to their health as such deleterious influences as desiccation or extreme temperature. Additionally, an experiment that placed seedlings in a large metal tumbler to simulate rough handling led to lower initial growth.

Many studies have also examined the effect of drought on seedling performance. In a drought, most newly planted seedlings suffer from shock and water stress. Once shoots begin to elongate, an intense water demand is placed on roots. Water uptake can be greatly inhibited by poor root-to-soil contact, which may develop if even a thin layer of air exists around roots. Instead of relying on rainfall, managers can improve survival by irrigating right after planting, because irrigation fills air spaces, establishing a bridge favourable to root growth.

This research was designed to:

- Examine the vigour of white spruce and white pine seedlings after rough handling during shipping from nursery to planting site.
- Study the effect of irrigation in overcoming damage to newly stressed seedlings.
- Evaluate the possibility of using bud flush as a reliable predictor of stress on seedling performance.

Materials and methods

Plant material

The tree species chosen for investigation were white spruce and white pine, both currently planted and harvested commercially in Ontario. A recent study has suggested that white pine is especially sensitive to rough handling and that white spruce is relatively tolerant. Three-year-old bareroot seedlings (3+0), lifted in late fall of 1993 used in this study, were acquired from the Ontario Ministry of Natural Resources Nursery in Orono, Ontario.

Stress treatments

Seedlings were placed in a room at 4°C for one week after being shipped. Sixty seedlings from each species were then randomly selected from the same tree bag. For each treatment, five seedlings with roots and shoots that did not appear to be damaged were randomly chosen from the lot of 60 and placed horizontally at the bottom of a standard plastic-lined kraft tree bag. Approximately 20 kg of additional seedlings were placed on top, to simulate a full bag of seedlings. A separate bag was then dropped 10 times from each of three treatment heights –1 m, 1.5 m, and 2 m. A control treatment was similarly prepared but not dropped. After treatment, each seedling was planted in a 6-L pot using Promix as soil medium, and then placed in a greenhouse for three weeks.

Irrigation treatments

To study irrigation effects, 50% of the treated seedlings from each species were watered within four hours of potting. Because the number of seedlings was uneven, three of five seedlings per treatment were irrigated within four hours of treatment for two blocks, and two of five seedlings in the third block were irrigated. Remaining seedlings were watered 48 to 52 hours after potting.

Evaluation

Two methods were used to evaluate treatment effects on seedling performance: root growth potential (RGP) and bud break. RGP was quantified by counting the number of new roots produced over the three-week period. A classification system was used, based on number of new roots more than 1 cm long. There were six scores:

ranging from zero to five. Seedlings with high RGPs were judged to have high vigour and performance potential. Bud break was scored as positive if any new foliage was evident or if buds had expanded and new needle colour was apparent. Seedlings were assessed for both bud break and RGP three weeks after potting.

Results

Stress treatments

Root-growth potential for both species declined with increasing distance dropped (Table 1), although for spruce the decline was inconsistent. The number of buds that broke dormancy over the three-week period similarly declined with increasing distance dropped (Table 2). However, significant differences in number of trees with bud flush occurred only in white pine. The mean number of new roots produced three weeks after dropping was significantly ($P < 0.05$) and substantially less for white pine seedlings dropped from both 1.5 and 2 m; for spruce, no significant ($P < 0.05$) difference was noted among drop heights (Table 3).

Irrigation treatments

Both species exhibited a trend towards general reduction in RGP, number of buds breaking dormancy (Table 4), and new root production (Table 5) as the interval between time of planting and watering increased. However, these differences were not significant ($P < 0.05$).

Stress-irrigation interaction

No significant interaction between drop treatment and timing of irrigation was observed ($P < 0.05$). However, early irrigation may ameliorate damage from rough handling, at least in white pine (Table 1). For spruce, greatest reduction in RGP occurred when seedlings were dropped from 2 m and irrigation was delayed for 48 hours.

Discussion

Dropping seedlings reduced RGP in both species, although white pine appeared to be more sensitive to rough handling than white spruce. However,

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Table 1: Median root growth potential, by height dropped and irrigation treatment

	Root growth potential			
	White pine		White spruce	
Height dropped (m)	Irrigated within 4 hr.	Irrigated within 48 hr.	Irrigated within 4 hr.	Irrigated within 48 hr.
0	4	3	4	3
1.0	3.5	0	3.5	4
1.5	1.5	0	4	3
2.0	0	1	3	0

Note: 0 = no new roots; 1 = new roots < 1 cm; 2 = 1 to 3 roots > 1 cm; 3 = 4 to 10 roots > 1 cm; 4 = 11 to 30 roots > 1 cm; and 5 = more than 30 roots > 1 cm.

Table 2: Rate of bud flush by height dropped

Height	Bud flush (%)	
dropped (m)	White pine	White spruce
0	86a	53a
1.0	44ab	53a
1.5	36b	33a
2.0	44ab	27a

Table 3: Mean number of new roots produced , by height dropped

Height	Mean no. new roots	
dropped (m)	White pine	White spruce
0	16a	22a
1.0	8ab	18a
1.5	5b	18a
2.0	2b	12a

Note: Values within columns followed by the same letter are not significantly ($P < 0.05$) different.

Table 4: Rate of bud flush on seedlings, by irrigation treatment

	Bud flush (%)	
Irrigation	White pine	White spruce
Within 4 hours	57	49
Within 48 hours	49	35

Table 5: Mean number of new roots produced, by irrigation treatment

	Mean no. of new roots	
Irrigation	White pine	White spruce
Within 4 hours	11	21
Within 48 hours	4	14

Note: There are no significant ($P < 0.05$) differences between values within columns.

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this difference in root growth may be a function of an unequal number of initial roots (lateral and fine roots) between the two species or a difference in physiological response rather than a response to environmental factors: white pine may have appeared more sensitive because its RGP was lower to begin with than that of white spruce. Moreover, the seedlings in this experiment, taken as they were from the bottom of the dropped bags, would likely have been most severely impacted. Other seedlings in the bag may not have sustained as much damage.

Some studies found that Douglas fir began with a lower RGP than Sitka spruce, and confirmed that peak RGP for Douglas fir was in midwinter, whereas the RGP peak for Sitka spruce was in late summer. There is a similar disparity in RGP between species under the same treatment. In all treatments, Sitka spruce had at least five times more roots than Douglas fir.

The negative relationship of RGP to increasing drop heights observed in this study was expected. A black spruce study, using seedlings at the Ontario Forest Research Institute, dropped at the same frequency and height range support our results. Mean RGPs of 4.6, 4.9, and 3.9 for black spruce seedlings dropped 10 times from heights of 0 m, 0.5 m, and 2 m, respectively, were reported. Another study, in which the seedling was struck with the toe of a boot to knock off dirt after lifting, also showed a decrease in RGP. In that study, the RGP of roughly handled Sitka spruce seedlings was only 150% of the RGP found in control seedlings.

Because there was no apparent mechanical damage to roots or shoots from the treatment in the present study, reduction in RGP may be due to cytological damage. A study that measured ethylene production of vascular plants that had undergone mechanical stimuli, revealed a change in the permeability of the cell membrane and an increase in ethylene production. Because ethylene plays a role in producing phytoalexin-like stress metabolites that reduce growth, it is likely that mechanical stress increases ethylene production and subsequently inhibits growth.

One report indicates an increase in electrolyte leakage and respiration levels in Sitka spruce seedlings subjected to several (1, 5, or 15) drops from 10 cm, 100 cm, and 300 cm. This suggests that cell membranes were damaged, resulting in impaired transmembrane electrolyte transport.

Irrigating planted seedlings after stress may have a mitigating effect, especially for white pine, and further tests should be carried out to define this effect. RGP was less in plants irrigated 48 hours after being dropped than in those irrigated four hours after dropping (Table 1), which may be of ecological significance, even though statistical testing was not done on this class data.

...white pine seedlings showed a decrease in RGP after drops of 1 m or more, and white spruce seedlings showed a similar decrease at 2m...

Water is obviously important to plants under stress, especially when seedlings are newly transplanted. Stressed seedlings show decreased transpiration rates and a partial closure of the stomata, and these effects may last for a day or longer, depending on severity of root disturbance.

Spruce needles are shorter and have a thicker waxy layer than pine needles. This provides spruce with a higher water stress resistance, indirectly seen in the results: irrigation of white spruce resulted in no significant difference in RGP between four-hour and 48-hour treatments (unlike irrigation of white pine).

Conclusions

Results confirm that rough handling can have a negative effect on seedling growth. White pine seedlings showed a decrease in RGP after drops of 1 m or more, and white spruce seedlings showed a similar decrease at 2 m. The mean number of new roots produced three weeks after dropping also declined in both species, although the decline was significant ($P < 0.05$) only in white pine. Results underscore the need for careful handling of seedlings during transport from nursery to planting site.

The greater sensitivity of white pine than white spruce to rough handling can be used in practice to develop different handling procedures for the two species. For example, irrigation of white pine seedlings may be useful in offsetting handling stress and improving survival.

Although RGP has been widely accepted as a sensitive measure of seedling vigour, it can be time consuming and requires destructive sampling. Bud flush provides a quick, non-destructive method of assessing seedling vigour. It has the advantage over methods such as dormancy release index (DRI, or the number of days after planting before bud flush) of requiring only one visit per plant. Evaluating bud flush might be an excellent method if it could be used to assess the vigour of outplanted seedlings. However, further evaluation of bud breakage in relation to mechanical stress and relative to the length of time required for flushing in individual species is required to refine the technique.

Results pertain only to seedlings taken from the bottom of tree bags. Further research is needed to evaluate the impact of rough handling on seedlings not found at the bottom of the bag.

Acknowledgments

The authors wish to acknowledge the help, assistance, and guidance of D. Maki (Ontario Forest Research Institute), Oliver Van Stratten, Sheila Pease, Tim Bohn, and J. Hubert. The project was supported financially by the Ontario Ministry of Agriculture and Rural Affairs. ❖

Applying the lessons from the top of Carmanah

Note: This article is reprinted from Renewal *(Spring 1995), the newsletter of the BC FRDA. A canopy research platform was first established in the Carmanah by the Western Canada Wilderness Committee*

The idea is to stare straight ahead and not look down, according to Dr. Richard Ring. "Once you get to the top, the dense canopy obstructs your view of the ground. You don't get the feeling of height up there."

Perched 200 feet above the ground, Ring and his University of Victoria colleague Neville Winchester do manage occasionally to travel out beyond their giant Sitka-spruce hut only by walking narrow alleys of mesh and rope called "Burma bridges", which connect the main platform of their research project with the surrounding tree tops. But only Winchester has done that so far.

Most of their work has been at the centre of that main platform. In the past two years, Ring and Winchester have collected 1.2 million specimens and perhaps more than 10,000 species of spiders, beetles, weevils, mites, parasitic wasps, flies, etc. — just about one-fifth of the species of insects expected in Canada can be found right here — in a massive 1000-year-old Sitka spruce forest in the heart of BC's Carmanah Valley.

It's only very recently, however, that some of the implications of their work have begun to sink in. Uncovering insects and arachnids previously unknown to North America, such as some species of Dendrozetes mites, beetles, parasitic wasps, etc., has scientists speculating not only about what else might be out there in the temperate and tropical forests of the world, but also about what may have been lost and what remains to be saved.

The discovery, for example, that old-growth forests are remarkably resilient to outbreaks of pest insects like bark beetles or defoliating caterpillars may have profound significance for less-hardy second-growth forests. Foresters don't plant Sitka spruce in a lot of second-growth stands, says Winchester, "because there's a weevil that gets into the plantations that kills a large proportion of seedlings."

...in these old-growth forests, there's a huge set of natural controls such as predators and parasites that keep potential outbreaks in dynamic balance...

Why doesn't this happen in old-growth forests? "We're finding that in these old-growth forests, there's a huge set of natural controls such as predators and parasites that seem to keep potential outbreaks in some sort of dynamic balance," Winchester explains.

Insects called parasitoids prevent damage to old-growth forests by laying their eggs on insects from other groups such as defoliating caterpillars.

Those eggs hatch into larvae, and the larvae devour the host caterpillars. Predators and parasitoids don't work separately. Nor do they wipe out the entire stock of offending caterpillars or weevils. Instead, they work in communities, or feeding guilds, killing just enough, apparently, to strike a balance that protects the old-growth forest as a whole. They might do the same

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Nursery industry trends across Canada

This issue, *Canadian Silviculture Magazine* presents its first national overview of the Canadian nursery industry. The challenges facing the industry are similar in many jursidictions. The universally downward trend in government seedling orders has meant that growers have had to seek new markets and work more closely with the forest industry.

Photo by M. Bolton

BC nurseries in good shape despite downturn

John Betts

Reforestation sowing requests across BC are down this year, with some sources predicting declines as dire as 20% across the board. But the people who grow the seedlings say their industry is in good shape – this in spite of further anticipated reductions in treeplanting numbers in the next few years.

The most significant decline in the demand for seedlings this year comes from the BC MOF. Their program has shrunk from around the 75 million mark in 1994 to 58 million trees last year. This year's sowing sits at 39.3 million – a drop of almost 50% in two years. Preliminary figures for industry requests show only a slight drop this year from previous levels.

According to MOF, the large decline in their program is all part of the long-term plan. "Much of this reduction [in sowing requests] is due to the elimination of the industry outstanding areas logged before October 1987," said Drew Brazier, director of the Ministry of Forests' nursery and seed operations. "Other backlog areas have also been reduced. All along, as these obligations were completed, we expected that the ministry's financial responsibility would be shrinking."

Nevertheless, with the ministry planting fading to diminished levels, operators, many of whom have been busy increasing nursery space in the last five years, aren't saying yet that their 38-nursery industry faces a problem of surplus capacity. And if it does, they're working on strategies to offset the impact.

"We see that BC is definitely not going to be in a growth mode

and, in all likelihood, we are going to see a reduction in the number of seedlings," says Dan Davies, vice-president of finance and administration for Pacific Regeneration Technologies.

Davies says reductions to the allowable annual cut, recent land-use decisions and the Forest Practices Code are all contributing to a decline in seedling requests in BC at the moment. Just where the decline will level off is uncertain until all these factors actually get put into practice. In the meantime, nursery operators are looking at other markets and products.

"We're all going to have to look for other niches to work in as well," says David Lloyd of Pelton Reforestation. "The reality is you have to have customers. We've grown lettuce and flowers. Quite a few nurseries do horticulture shrubs and nursery centres."

BC nurseries are also looking at silviculture markets in other provinces and the US.

Even with the predicted decline in the numbers of trees, the loss may not translate directly into vacant nursery space. The trend towards larger stock requiring more containers has kept greenhouse space occupied. To some extent, it has accounted for the growth in nursery space in the last few years. Some nursery operators say that trend may offset dropping seedling numbers along with the industry's silvicultural obligations since 1989 to produce free-to-grow plantations. These responsibilities may require more intense silviculture practices depending on the success of the plantations.

...the trend towards larger stock requiring more containers has kept greenhouse space occupied...

"The year 1997 is the earliest people are going to be doing critical free-to-grow surveys," said Lloyd. "The forest service won't be disengaging any one of their responsibilities for a couple more years. It may be then that things start to come through."

Seedling production peaked in the late 1980s, and for a short time, there was an actual shortage of nursery space in the province. That led to a seller's market, but it was short-lived, leading to a precipitous drop in prices from which nursery operators say they haven't fully recovered.

"Prices took quite a drop in the '89-'90 era," says Davies. "They have come up a little bit but the prices are still 5 to 10% lower than what they were in 1988." The price of seedlings has been a nagging problem for tree growers considering that customer expectations and production costs have increased. The problem is worse for nursery operators who say they've improved the quality of their product significantly, but those improvements may be lost on their clients if the trees are handled or planted poorly once they leave the nursery. Some nurseries have tried to educate their customers. Others have tried to interest companies in stewardship contracts where the nursery takes over the obligations to produce free-to-grow plantations. Companies agree in principle with the idea but actual contracts have been a hard sell, so far, say operators.

Québec players dropping out

Production of seedlings in the 94/95 growing season declined in Québec — an average 15% decrease compared to the previous year. Certain regions were hit harder than others, some seeing a 30% drop. This is a result of changes made by the Québec government to the tendering process.

One major producer, Coopérative Forestière Haat Plan Vert, has left the industry after producing 400,000 seedlings the previous year. Another, Serres Coopérative du Guyenne quit in the middle of the 1995 season.

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Alberta seedling capacity expands

Larry Lafleur, RPF

Until the late fall of 1993 the Alberta government, as part of its overall reforestation plan, provided much of the forest industry with free seedlings for planting harvested areas. The quantities and stock types of seedlings provided to various companies varied with the Forest Management agreements each particular company had negotiated with the government. In 1993 the government decided (as part of the restructuring of the forest industry) that all companies cutting over 100,000 cubic metres of wood per year would be required to purchase their own seedlings direct from forest nurseries. Those under 100,000 cubic metres have the option of doing their own reforestation or paying a levy to the government to have it done for them.

In 1993 there were 21 forest seedling nurseries operating in Alberta that provided approximately 42 million seedlings in 1993, or 57% of the 72 million required for reforestation. This group of nurseries consisted of one government-owned nursery, two forest industry-owned nurseries and 18 privately owned- and operated-greenhouses. Other than eight million bareroot transplants grown at the government facility, the rest was all greenhouse-grown containerized stock. The remaining 43% or approximately 30 million seedlings were provided by out-of-province nurseries, the majority of them well-established and British Columbian.

By sowing time in 1996, significant changes have taken place in the Alberta seedling industry. Of the 21 nurseries growing reforestation stock in 1993, only 12 are still doing so in 1996 (10 privately owned, one government owned and one forest industry owned). One other has been sold and refurbished, and is now back in production under the ownership of K & C Silviculture Farms Limited, who also have a large facility in Oliver, BC. In addition, two new nurseries have been built in Alberta by the established BC seedling-production companies of Pacific Regeneration Technologies and Woodmere Nurseries.

So what does this all mean to the seedling industry and to reforestation efforts in Alberta? In 1993 the capacity to produce seedlings in Alberta was at approximately 42 million or 57% of Albertan requirements. In 1996 the requirements for seedlings is slightly lower than 1993 at approximately 65 million per year. The capacity to grow seedlings in Alberta nurseries has expanded dramatically and now stands at approximately 65 million or 100% of requirements. Note that in both cases the numbers are estimated, because with the turnover of purchasing to industry,

Container seedlings. Photo by M. Bolton

no one agency or person knows for sure how many are grown or ordered each year.

This expanded capacity is due to the addition of the two new nurseries built by the BC companies with combined capacity of approximately 12 million seedlings, and the expansion of the 11 surviving private nurseries from a capacity of 22 million in 1993 to 53 million in 1996.

Although the capacity to grow seedlings and the requirements are almost equal, not all of the nurseries are producing at capacity in 1996. Somewhere between 10 and 15 million seedlings per year are still grown out of province. These are mainly 2+0 container seedlings grown in outdoor compounds, but also include some 1+0 greenhouse-grown container seedlings and some bareroot stock grown by BC nurseries. In turn, Alberta nurseries are growing stock for reforestation in both Saskatchewan and British Columbia.

...somewhere between 10 and 15 million seedlings per year are still grown out of province...

Two years after the Alberta government started requiring industry to purchase their own seedlings for reforestation purposes, the forest nursery industry in Alberta has undergone significant change. The nursery industry in Alberta has expanded faster than the demand for seedlings. As well, the quality of the stock produced has improved dramatically. All but a couple of Alberta's forest industries now purchase the majority of their stock from Alberta forest nurseries. The shakedown of nurseries is all but complete, and Alberta now has a well-defined group of experienced seedling growers who are able to meet the lumber industry's requirements, and are willing and able to expand to meet any increased demand if it develops.

Maritime seedlings down

Gary Westenenk

The Eastern seedling industry has experienced a steady decline in the past number of years due in part to cuts in federal funding for regeneration. Provincial governments have been following suit, doing everything from cutting vital program dollars to instituting policies of "whatever grows back is good enough" – also known as "let nature take its course." This policy is fine if we do not want to harvest *any* products from our lands.

The three Atlantic provinces are as diverse in composition as they can be. New Brunswick's forests are given the best care with a management policy instituted many years ago. But if it had not been for pioneers like K.C. Irving, Rod Bezzant and others, the forests would be in terrible shape today.

Nova Scotia's forests are mostly owned by private landowners, and as such, the government has special problems with instituting policies. This gives no excuse for short sightedness that will eventually lead to future generations having no sustainable industry. Government-built nurseries sold a few years and several millions of dollars later indicate the politics involved. There was and is a private nursery industry in that province waiting for policy changes.

Prince Edward Island has always had a government-run nursery that has produced quality stock. The government has had the foresight in this agriculture- and tourism-fueled province to maintain the presence of a viable industry.

Seedling cutbacks in the Atlantic provinces have been drastic. The number of seedlings grown in 1986-87 were 77 million compared to only 52 million in 1994-95. It is time for Maritime politicians to listen to the people most effected by their decisions— the tree growers and the children who will have to live in a province that is lacking one of nature's basics, a healthy vibrant forest. Also missing will be an important resource they can use in building their houses, teaching their children to read and write, and passing along their histories.

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Ontario policy notes from the 1996 LUSTR Co-op nursery workshop

Irwin Smith, LUSTR Administrative and Research Director

Note: This is an edited version of an article from the LUSTR Co-op News *(vol. 3, no. 1). Copies are available from the LUSTR Co-op, Biology Department, Lakehead University, Thunder Bay, ON, P7B 5E1.*

The January workshop, opened by David Euler, Dean of the Faculty of Forestry at Lakehead University, focused on issues around Ontario's new Forestry Act, on the consequences of the privatization of research for the nursery sector, and on root systems.

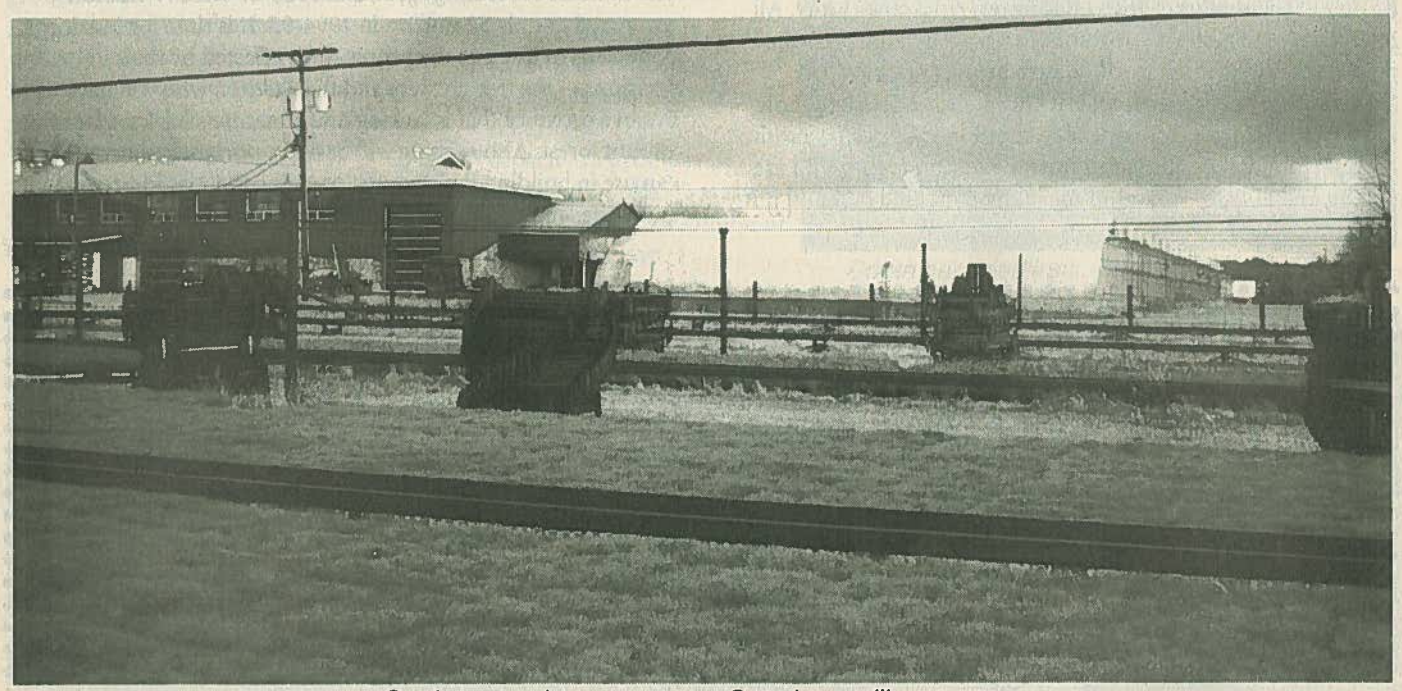
The new Forest Act and its implications for seedling growers

Judy Skidmore of Silvicultural Services outlined some of the changes affecting the tree seedling industry as a result of the introduction of the new Crown Forest Sustainability Act (Bill 171) in 1995. According to this new legislation, all company- and Crown-managed units now have dedicated funding in place for forest renewal, derived from cubic metre harvest charges. If there is a reduction in the use of the funds by a unit, their contribution could be reviewed and reduced. If these savings are achieved, for example, through the use of alternatives to planting seedlings, this would present some danger to seedling growers. These funds can be held over from year to year, which allows silviculture managers to budget ahead.

Skidmore works with smaller companies with different visions for future forests. Since her company is responsible for responding to clients with justification for all management decisions, one of her concerns is, Can the planting of seedlings be justified? Tree seedling growers are responsible for pooling their resources to provide facts to convince policy makers, bureaucrats, politicians, and above all, the public that tree seedlings are necessary. Skidmore emphasized tree seedlings need to be reflected in provincial prescriptions. She suggested that growers should access new methods of predicting the benefits of tree seedlings over other silvicultural methods.

For more information, call Judy Skidmore at (705) 869-4228.

...growers should access new methods of predicting the benefits of tree seedlings over other silvicultural methods...



Outdoor growing areas at an Ontario seedling nursery.

Forest companies and the new Forest Act

Bill Klages is silvicultural prescriptions manager at Avenor in Thunder Bay. Klages outlined how changes in the Forest Act affect timber companies.

1) Montreal Trust manages the trust funds. The old stumpage fees will be used to start the funds. After five years, the company must maintain the balance.

2) Rates have been set for conifers and hardwoods, and this goes into the trust funds. These funds are not transferable between Forest Management Areas (FMAs). Funds can be withdrawn by the company, based on invoices chosen from within a list of allowable silvicultural practices.

3) A Forestry Futures Fund has been established, based on the old area charges. Companies can apply for these funds to help with insect, fire, etc. damage to areas.

4) The same changes are being made to the Crown Management Units (CMUs). Since most of the funds went to the FMAs, the move is to privatize the CMUs.

5) MNR tree nurseries are being closed. Companies need the flexibility to delay seedling decisions (based on mill demands, etc.), which is not possible with bareroot seedlings. In addition, bareroot seedlings have higher production costs.

6) Mills need to modernize and expand. More fibre is needed that will require a shorter rotation time, better spacing and increased quality. Seedlings are needed for this; natural regeneration won't do it. Seedling field performance evaluations are needed.

7) The forest must now be considered as a whole not just for the trees.

8) There is no provision for research and development in the trust funds.

For more information, call Bill Klages at (807) 473-2488.

Reforestation volunteer policy committees

The formation of a Volunteer Policy Committee was explained by Jane Fox of Birchill Forest Renewal Centre. Fox volunteered to form a committee to review reforestation procedures in Ontario, especially with respect to replanting the forests. She remarked that there appears to be no provincial-stated policy on seedling replanting, and asked for facts and figures to be sent to her to support a tree seedling provincial policy. She asked if there were economic figures available to show the benefit of planting seedlings, and asked that industry be made aware of the importance of reforesting with seedlings. Fox stressed that in these times, growers have to sell their product. A suggestion was made that anyone interested in having a say in reforestation procedures should get on a local citizen advisory committee set up for the SFLs. Anyone interested should call Jane Fox at (705) 272-6185 or fax (705) 272-6659.

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LUSTR roots round-up

Note: This article was edited from notes on seedling-root research presentations at the January 1996 LUSTR Co-op workshop. Reprinted with permission from the LUSTR Co-op News *(vol. 3, no. 1). For ordering information, see the previous page.*

Root hardening, root re-freezing and copper tray usage

Kerry Odlum of the Ontario Forest Research Institute (OFRI) quoted work done by Steve Colombo on root hardening that showed that black spruce has a limited capacity to root harden in the first four weeks after bud formation. Warm temperature exposure, followed by cool temperature, will result in the greatest hardening by roots (and shoots), and woody roots were found to be more hardy than fine roots. Root hardiness was also found to differ, depending on the depth of the roots.

In a separate study, Odlum took seedlings from three nurseries that had been overwintered outside or kept in cold storage, and tested their capacity for root regeneration in a hydroponic system at 5 and 20°C. Roots did not develop well at cool temperatures and, at the higher temperature, roots from cold-stored stock were as good as or better than stock overwintered outside. The roots at the colder temperatures were not dead, just slower to get going.

On the subject of root re-freezing, Odlum was interested in knowing if seedlings, which were thawed in spring and couldn't be planted for some reason, could be put back into cold storage and then used again later. He thawed seedlings at 5°C and left them thawed for two, four, six, eight and 10 weeks. At the end of each period, he placed them back into storage at -2°C for four weeks before re-thawing and using a root growth potential (RGP) test to test for viability. Re-freezing for four weeks and thawing did not affect RGP but, after six weeks of thawing, the buds started to break. Their further development was, however, suspended if the seedlings were replaced in the cold store.

On the subject of copper blocks, Odlum discussed data that compared seedling morphology of jack pine and black spruce grown in Ventblocks and copper blocks. Shoot length, shoot dry mass and RCD were similar. But the copper blocks showed a +25% increase in the number of roots in the upper root dry mass (RDM), with a corresponding decrease of 50 to 60% in the root dry mass in the lower root dry mass. Total RDM was about 15% lower in the copper block. There was obviously an increase in the shoot to root ratio. RGP tests on these seedlings showed there were almost twice as many new roots emerging in the top section from copper block seedlings as from Ventblock seedlings, and equally as many from the lower section.

...top ten abiotic factors affecting disease: moisture, temperature, moisture, temperature, moisture, temperature....

Plant analysis showed that there was five times as much copper in the shoots and 15 times as much in the roots in the copper block seedlings. Outplanted seedlings showed no differences in shoot growth after one year.

Root diseases in containers

Dr. Tim Meyer of OFRI addressed the root causes of diseases in containers. Meyer defined disease as a disturbance interfering with physiology. He outlined a disease triangle between pathogen, host and environment, and stressed that disease is an *interaction.*

Meyer gave a list of the top ten abiotic factors affecting disease: temperature, moisture, temperature, moisture, temperature, moisture...

We can alter the environment to manage disease. Remember, by the time you see symptoms, damage has occurred at some time in the past. In addition, the presence of fungus doesn't mean disease - you need all three components!

Plants can be predisposed to disease in three ways:

- Tolerance to some stress with no manifestation of disease;
- Elastic predisposition: more stress, more disease or less stress, less disease; and
- Inelastic predisposition: doomed!

Meyer's three take-home messages were:

- Abiotic disorders are the greatest cause of root mortality;
- Most biotic root diseases are stress related; and
- Proper regulation of environment (especially temperature and moisture) is the most effective defence against disease.

For information, call (705) 946-2981.

Sources of root disease

Sylvia Greifenhagen and Glenna Halicki-Heyden of OFRI illustrated, through the game "Pin the Fungi on the Greenhouse," that *everything* is a source of fungi (seeds, people, benches, containers, water sources, etc.).

Greifenhagen presented a simple equation for disease:

FUNGI + STRESS = DISEASE

She recommended we take an integrated approach and manage for both fungal sources and stresses. Preventative measures were suggested including sanitation; cleaning containers, benches, equipment, and seed; use of lighter coloured peat; sand filtration of water; and stress management.

Halicki-Heyden presented the results of a study done in a central Ontario greenhouse on black spruce root decline. A wide array of environmental conditions was measured, and seedlings were monitored and tested for disease. It was concluded that stress played a larger role in the decline of the seedlings than did pathogens. Again, the important factors were temperature and moisture.

The audience's root-disease identification-skills were tested in a slide identification quiz. It soon became apparent that, often, the cause of the problem was not fungal but environmental. Fungal infection usually occurred as a result of management. So, remember, keep everything clean, and watch your temperature and moisture!!

OFRI runs a *Botrytis* root-rot screening program. Details are available from (705) 946-2981.

Root damage assessment models

Raymund Folk of the BC Research Institute (BCRI) discussed root damage assessment models used at BCRI. Measure of root electrolyte leakage (REL) is a good indicator of root cell integrity. If the roots are damaged, they will "leak". They have produced a model of REL using roots that were heat treated at 57°C for different lengths of time. BCRI has shown that as REL increases, photosynthesis, water potential, number of new roots and survival all decrease. Since REL is a sensitive root damage index, results can be interpreted to predict field performance. High values of REL mean more damage, which indicate lower initial survival potential.

For more information, call Raymund Folk at (604) 224-4331. ❖

From commotion to action: The 1996 WSCA Convention

John Betts

Most of the themes kicked around by the 60 silviculture contracting representatives at this year's 15th annual WSCA conference weren't new ones. What was different at the two-day Vancouver meeting was the obvious agreement that it was time to take those themes and run with them.

"At all the workshops, we've heard shades of things that have been mentioned in the past," said Chuck Emery as he stood for re-election to the 1996 WSCA board of directors. "The problem is, as I see it, we talk up a storm about a whole lot of good ideas but not all the things we want to do get done."

Emery said the industry could no longer afford to rely just on volunteer directors to follow through on the WSCA's initiatives. It was time to hire someone to put into action all the ideas and programs the association has been so good at thinking up in the past.

What seemed to galvanize contractors was Forest Renewal BC— an organization many in the silviculture business see, at the moment, as a looming threat to the province's established silviculture industry rather than a benefactor.

1996 WSCA Convention brochure. Conceived and produced by John Betts.

"We've got to present a stronger lobby to the FRBC," said WSCA director Dennis Graham during a workshop where contractors raised concerns about the accountability and effectiveness of the crown corporation. It's destined to spend millions in BC's forests, but ironically many contractors are worried some of that money may be spent at their expense.

"What's in place to see if this money is being wisely spent or just being dumped?" asked workshop participant Chris Howard.

More pointedly, contractors asked, should the FRBC be encouraging new contractors into the silviculture business while overlooking the members and workers of the existing industry by excluding them from participating in so called "partnership" agreements between industry and other selected groups? Contractors said those "partnerships" are exclusive, uncompetitive and potentially disruptive to their already crowded marketplace. They also complained about the FRBC proposing to back portions of loans to create new contractors in an industry they already see adequately stocked with experienced operators, like themselves, who learned the hard way.

"Shouldn't the purpose of the FRBC be to get the work done effectively and efficiently rather than create 'partnerships?'" asked Joyce Murray in a question-and-answer session with Dana Bonnieux, FRBC vice president of policy and planning. The WSCA has recommended that a totally inclusive marketplace for all FRBC work, one that encouraged the participation of efficient silviculture contractors, would ultimately create more jobs and better silviculture.

Bonnieux reiterated that the FRBC's social responsibilities as well as silviculture obligations must be weighed carefully. Besides, she added, "more than half of the proposals in the FRBC hopper don't have partners." That should leave lots of opportunities for contractors, she claimed. Bonnieux said the FRBC was under pressure "to get these partnerships up and working" but that the award stream was currently held up by the review and approval process.

Former Forest Minister Andrew Petter also reassured contractors that FRBC would eventually provide a healthy

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If you think those tabloid headlines are improbable how about these silviculture industry facts:

— Despite being major players in putting silviculture policy into practice for the last 20 years in Western Canada, the silvicultural contracting industry has no representation on the board of directors of Forest Renewal B.C. In fact, of the five advisory committees of the FRBC, the silviculture industry sits on three, giving it only that many voices among 78 committee members.

—Even though the silviculture business is worth billions of dollars in Western Canada the industry has yet to establish an effective and permanent lobbying presence in any level of government. Contractors have never had the ear of policy makers on a regular basis.

—According to Roger Stanyer chairman of FRBC mayors and municipal leaders around B.C. do not think the silviculture industry is making a contribution to their communities. Many of these mayors are now lobbying the FRBC to financially assist in establishing new silviculture contractors in their towns. Communities seem to have trouble recognizing the existing silviculture industry.

—The average life expectancy of a new silviculture contractor is estimated to be five years. If competition is good then the industry is suffering from too much of a good thing.

—According to contractors many of their basic concerns about the silviculture industry are the same ones they had 15 years ago. Some say this is the permanent state of the business.

These facts raise a lot of questions about the future of the silviculture contracting industry.

Finding the answers to those questions is the idea behind the theme for this year's **Western Silvicultural Contractors' Association Annual General Meeting February 1-2.**

Taking Charge of Our Business Futures,
Long Term Health — Not Just Survival

Liberally axing FRBC?

If the Liberals are to make good on their pre-election promise to cut provincial government spending by $3 billion, then they would have to take some of that money out of Forest Renewal BC, said then Forest Minister Andrew Petter, speaking at the WSCA conference.

Petter said the Liberals plan to reduce government spending here by twice the amount being cut in Ontario, while at the same time sparing BC's education and health programs— the money will have to come from somewhere.

"And you don't have to be a rocket scientist to figure out where that might be. If you add up the [Liberal budget] figures, it doesn't give you a lot of confidence."

In a speech to contractors, Petter reviewed the NDP's forestry record including its land use plans, the forest land reserve, the timber supply review, FRBC and the Forest Practices Code. He also announced FRBC had set a goal of adding at least $100 million to its investments to land-based programs in 1996/97 to bring expenditures in this area up to $175 million.

Petter criticized the federal government for pulling out of its forestry and social responsibilities under the FRDA. At the same time, Petter said FRBC would provide another $18 million to continue stand-tending work that is now being funded by FRDA.

No, they wouldn't, but...

Saying that they only intend to hold the line on government spending, the Liberals have denied they would use FRBC funding to save $3 billion annually if they form the next government.

"There is no intention on behalf of the Liberals to change FRBC," Liberal forest critic Fred Gingell told contractors at the WSCA annual conference.

However, Gingell left contractors wondering after he described the need for greater accountability in the public sector.

"There may be more money than is needed in the FRBC, for instance," Gingell said.

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portion of work for the contracting community. In a speech noted more for its pre-election resonance rather than Petter's usual informal candor, the minister asked the contractors to allow FRBC a grace period to sort out its inventory of priorities and implement its mandate.

"The reality is silviculture contractors are already benefiting from Forest Renewal investments. And as Forest Renewal increases its funding for enhanced forestry, contractors can expect to get a fair share of the incremental work generated."

Still, contractors acknowledged the work wouldn't land on their plates unless they lobbied for it the same way other interest groups work the FRBC. "The board of directors can direct, but there still has to be someone to execute effectively," said silvicultural sheepgrazer John Dunn. There was a clear consensus at the conference that the contractors should approve the hiring of an executive director to further the association's lobbying strategies. WSCA Chair Peter Gommerud pointed out that the directors had already managed to exert some effect on the FRBC despite their stretched resources. (See sidebar on page 34.)

"It isn't all necessarily gloom and doom," said Gommerud referring to the WSCA's successful lobbying to have changes made to a recent FRBC proposal guidebook that, until the association spoke up, scarcely mentioned silviculture contractors at all. Gommerud said the WSCA was working on similar strategies with the FRBC to further the interests of silvicultural sheepgrazers.

The predicament of the sheepgrazers as described at the conference seemed to be a case in point where a group of silviculture contractors have gone unheard by policy makers. After a period of reasonable growth, the industry last year found itself being shut out of clearcut pastures across the province. A $5-million industry in 1994, sheepgrazers are only looking at a third as many contracts this year, and they worry the decline will continue without some input from the WSCA.

"The problem is perhaps we haven't been noticed," said Alan Neville. "It behooves us to encourage the industry. Foresters don't know how to use this tool. If it's done right, it works. It's just that simple."

...the predicament of the sheepgrazers seemed to be a case in point of silviculture contractors unheard by policy makers...

But just because something is simple and it works is no guarantee it will get used. Even though bureaucracies do appear to defy logic occasionally, they and the politicians who set their agendas are understandable and sometimes even predictable— at least according to Aidan Vining, a Simon Fraser University public policy and business administration professor who spoke to the conference.

Apologizing for what he feared might seem like an arid academic analysis of the silviculture industry, Vining then proceeded to hit various contracting nails on the head.

"Governments are only moved by cohesive and encompassing groups," said Vining referring to the fractious tendency of some contractors to let their intramural competitive grievances interfere with their ability to work collectively outside their businesses to lobby in the industry's broader interests.

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Simon Fraser University professor Aidan Vining. Photo by Martin Labelle.

WSCA and FRBC to collaborate

The WSCA and Forest Renewal BC have agreed to jointly fund a forest renewal coordinator to act as a link between silvicultural contractors, communities and government. The current agreement is for two years, contingent upon a review after the first year. FRBC will be putting up $100,000 over the two-year period.

The coordinator position, which the WSCA plans to fill before the end of April, follows a major initiative begun at this year's annual WSCA conference.

Silviculture contractors have felt left out of the FRBC policy loop with no one representing the industry on the board of directors and just a handful of contractors on FRBC committees. However, contractors think that will change with someone in place full time to execute WSCA initiatives and lobby government. They also expect a coordinator to raise the silviculture industry's profile and give it some much-needed recognition from government and communities across the province.

"This is where we get to make good on our offer that our industry and our contractors can be part of the solution - that we can be part of having BC's forestry something to be proud of," said Joyce Murray who handled negotiations with FRBC on behalf of the WSCA.

According to Murray the deal already means recognition and a significant change in attitude from the FRBC towards the silviculture industry.

"So far, the WSCA lobby has focused on shifting the FRBC's and the forestry community's perception that silvicultural contractors have nothing to contribute ... this agreement is a real manifestation of a change in that attitude."

The coordinator's role will include disseminating FRBC information to contractors, as well as acting as a conduit for input from the silviculture industry to FRBC. The WSCA will also use the position to reach resource communities in the province to increase understanding of the silviculture industry. Part of that role will link FRBC partners with existing experienced silviculture contractors.

The coordinator will work with other government agencies to get silviculture industry input into regulatory changes and initiatives. Links with training programs for silviculture workers will be another coordination responsibility.

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"Contractors have to think of themselves as being in two completely different industries. One is their primary business— the job where individual contractors compete for the work. The second is the business of working with government— where contractors must work together, to collaborate to influence government policy."

Vining observed that contractors were good at the former and not so good at the latter. The professor then outlined some business terrain familiar to the industry, including the "winner's curse"— one of the effects of the low-bid auction system. He also delineated the frustrating silviculture industry reversal of the "learning cycle" where being experienced and good at your job doesn't necessarily get results.

Vining also recognized the "free rider" syndrome where contractors don't support organizations like the WSCA but still get the benefits. Part of the solution to that is to make sure the association listens to and addresses the various needs of its constituents whether they be large regional contractors, small local operators, thinning contractors, treeplanters or sheepgrazers, he said.

...contractors have to think of themselves as being in two completely different industries: first, their primary business– where individual contractors compete for work; second, the business of working with government– where contractors collaborate to influence government policy...

"To be successful in lobbying you must first get some wins. Go for small ones and get some leverage. Use your wins to convince others." Vining said this strategy would prevent politicians from engaging in "all or nothing negotiating" tactics, as well as attract members.

"Bureaucracies are well designed to be insulated from pressure groups," said Vining, "However, they are sensitive to individual MLAs. Start to work with, or on, politicians who you think are sympathetic."

Liberal forest critic Fred Gingell offered himself as an obvious candidate for WSCA lobbying when he mentioned he would

welcome input from the WSCA to take to the committee which reviews the FRBC business plan. "We think these matters need some public discussion," said Gingell, referring to some of the concerns WSCA members expressed about the FRBC.

Looking back on the conference, many contractors said they felt there was a real move from commotion to action.

"I feel positive about the conference," said contractor Bill Sinclair. "I think we've gone unheard in the last few years in terms of how intensive silviculture has been funded. I think it's essential we hire someone who can spend time giving us a voice to the policy makers full time. Just hearing from us once a year is not enough." ❖

Frankenstein BC

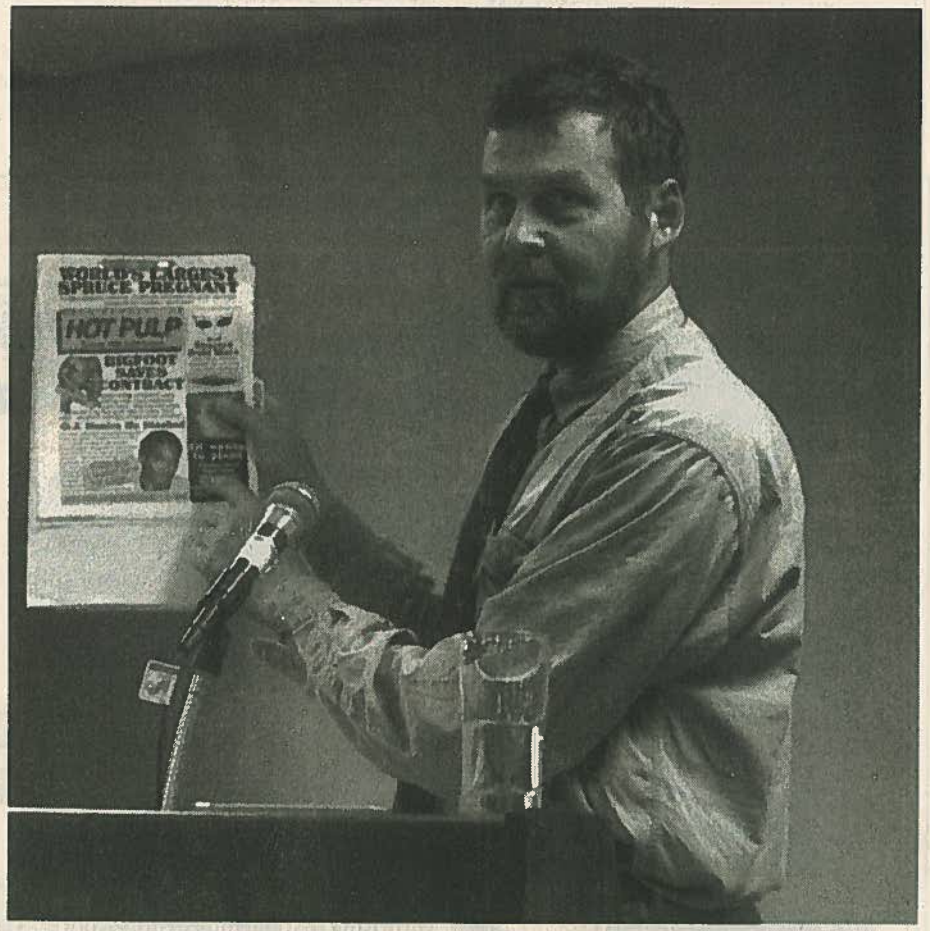
John Betts, opening remarks:

I'm a has-been contractor who quit the industry five years ago and MC'd WSCA meetings 15 years ago. Then, our main focus was lobbying government to create silviculture funding.

The WSCA's funding blueprint got stitched together as FRBC.

I'm sure you were all shocked to see, when it got off the slab and started staggering around smashing things, that Frankenstein BC was a monster.

And then when the IWA started telling it, "Do this. Do that," we realized that it didn't even recognize its parent.



Convention MC and chronicler John Betts. Photo by Martin Labelle.

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Seasonal UI update

Dirk Brinkman

Seasonal UI reform delayed one season

Thanks to the discord of the Québec referendum, seasonal UI reform did not pass through the House of Commons in time for implementation in 1996. Former minister Lloyd Axworthy's "repeat user" penalty proposals have not been axed, however. The Liberals have put the seasonal UI reform on a road show for "further input".

"Bored and lazy seasonal workers" protest UI changes

Doug Young, the new Human Resource Minister, does not seem too open to input from New Brunswick. He has suggested that people protesting reforms to UI in New Brunswick were "bored and lazy seasonal workers" who are "discouraging constructive solutions." In France, when farmers' prices and workers' pensions were threatened by government cut-backs, they simply shut the country down. What should the resource worker sector in Canada do when UI reform legislation threatens the foundations of our economy? It is not surprising that the minister does not want to encourage protests.

Annual rates paid seasonally

One proposed solution is to have seasonal employers and employees contribute a full year of UI during the projected work season in 1997. This could double or quadruple the rates for UI for seasonal forest and silviculture employers and employees. We would be very bored and lazy if we allow this legislation to pass without some input.

Replace the historic trade-off

This solution assumes that the steady contributions from government and service sectors have carried the seasonal UI load. This ignores the fact that seasonal resource workers have been producing the wealth that supports government and the service sector. There are several ways to replace this trade-off with a new deal.

Let the market pay

The present UI arrangement is perceived to be a form of protection for the seasonal workers. This is being opened up to market forces to allow another solution to emerge from a free market for labour and forest-product pricing. The solution is going to be a combination of employers and employees finding creative solutions and the markets responding. Ottawa hopes that the "constructive solution" is for seasonal employees to work longer seasons or year round. Employees and employers will try to find a way to get around the legislation. The market will respond with the minimum cost required to keep the product flowing – from Chile, if necessary.

...this ignores the fact that seasonal resource workers have been producing the wealth that supports government and the service sector...

UI payments reduced, number of weeks shortened

For 1996, UI payments are reduced from a maximum of $464.75 to $412.50, and the number of weeks worked is now the maximum number of weeks you can collect. This combined change could reduce seasonal workers UI income by $3,000-$10,000, and force many experienced silviculture workers to seek another career.❖

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for second-growth forests, suggests Ring. "That's one of the big take-home lessons of this project — comparing those populations in old-growth forests with the insect communities in a regenerating forest, then asking, "How could we possibly simulate that in our management plans for new forests?"

With money provided under the Canada/BC Partnership Agreement on Forest Resource Development (FRDAII), we may eventually find the answers to that question. One of the focuses of FRDA is the development of new methods of forest management, particularly in regenerating second-growth forest. The funding has enabled Ring and Winchester to set standards for bio-diversity sampling — the trapping of insects — at similar projects elsewhere in BC.

One important project to benefit from their work is a 200-hectare piece of old-growth on National Defence property near Victoria. Less than 1% of original old-growth coastal dry Douglas-fir remains. As such, this piece represents a rarer ecosystem than Carmanah, Winchester maintains.

He also predicts, "We'll find similar if not identical trends as we have found in the Carmanah. The species will be new, the names different, but will be consistently found to live in the same areas of the forest. So that's what we need to test. Is there a general principle here that applies to forests across the larger geographic region?"

Answering that question could have implications worldwide. In November 1994, at the International Canopy Research Conference in Sarasota, Florida, Winchester and Ring revealed the results of their temperate rainforest studies to experts from other countries. Their main message: the decline in biodiversity is not limited to South American rainforests.

"We were very enthusiastically received," says Ring. "I believe that we've put BC on the map for canopy research." In fact, world canopy-research scientists are so excited, they're planning another international canopy-research symposium in two years, and have asked Ring and Winchester to organize a session solely on temperate rainforest research. By exploring and sharing this sort of information, countries like Canada may adopt a more knowledgeable approach to the issues of bio-diversity and forest management practices. ❖

Sharing the costs of forest management in PEI

Wanson Hemphill, General Manager, PEIFIA

To share or not to share is not the question. How the sharing takes place is.

PEI was first on the chopping block for FRDAs, and the first to experience the pains of the weaning process. But where to start and who to lead the efforts towards forest management self-sufficiency? Where would the dollars come from for a smaller and leaner forest management program? Added to this turmoil has been the dramatic increase in softwood markets and harvesting, the need to replant many more trees and the ever-present 90% private land ownership.

...PEI was first on the chopping block for FRDAs, and the first to experience the pains of the weaning process...

After two years of talking, arguing and negotiating, a proposal has emerged in the form of a partnership between provincial forestry and private stakeholders including forest contractors, forest workers, sawmillers and woodlot owners, as represented in the Forest Improvement Association (FIA). Most stakeholders agree with the principle of sharing the cost of forest management. It is in the details of how money will be collected and spent, and contribution levels set that concerns arise.

The Forest Renewal Partnership and Checkoff Proposal outlines a contract agreement for contributions by the province, contractors and processors/shippers. A Forest Partnership Council consisting of FIA directors and Forestry Division managers would decide annual operating plans, rates and standards, and make necessary adjustments. The proposed contributions of $1.50/cord each from contractors and processors/shippers has been widely debated, and with the recent drop in pulp prices, has become a sticking point for some contractors.

Many joint Forestry Division/FIA meetings have provided suggestions and modifications that help meet stakeholder needs and allow for an agreement that everyone can live with. Some suggestions and changes to date include a two-year cap on contribution levels, a Renewal Trust Fund for any surpluses, input into the total Forestry Division Budget, and a commitment to a goal of re-establishing similar acreage of productive forests as is being cut. The proposed implementation start-up is April 1, so regulations and last minute changes are flying.

Related to the sharing of the costs of forest management is the business of developing a practices code to protect our immature forest stands and provide guidelines for appropriate and environmentally friendly harvesting and forest treatments. Viewed as a task for the Forest Partnership Council, a practices code represents a worthwhile and required goal, and will take considerable discussion and negotiation.

Other provinces in Canada will have to go through similar discussions and partnership arrangements in order to meet future forest management challenges. Each jurisdiction will need a model that meets its own particular situation, but PEI's experiences may be helpful. ❖

...the other provinces in Canada will have to go through similar discussions and partnership arrangements in order to meet future forest management challenges...

P.E.I. Forest Improvement Association

Box 27,
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Ian Dennison, President

Wanson Hemphill, General Manager

— P . E . I . —

Breeding trees for tomorrow

Wanson Hemphill, General Manager, PEIFIA

Tree improvement is a critical component of PEI's effort to manage forest resources. Timber supply forecasts indicate future timber shortages on the Island. If present harvest pressures continue without forest management, PEI could face the collapse of an industry important to many rural communities. When combined with demands for other uses of the Island's land base, forest reliant industries could find it increasingly difficult to secure enough timber to meet their needs. Tree improvement programs play an important role in tomorrow's forest by planting the best possible seed sources, which provide higher economic returns.

Tree improvement begins by selecting superior quality trees from across the province and then collecting scions (twigs) from their crowns. This collection process is conducted during the winter when the tree is dormant. However, it often means traveling deep into the forest by skidoo and climbing trees 20 to 30 metres in height in less than ideal weather.

Tree improvement programs follow the same basic principles used in other breeding programs found in the agricultural industry. Selections are based on superior genetic traits favoured by producers including growth-rate, form, disease resistance and wood product quality (i.e., density). Through controlled breeding, tree improvement programs seek to increase both the volume and value of future forest crops in order to maintain and enhance wood supplies. Improved forest yield could mean a reduction in area of managed forest needed to produce wood products. This may be particularly important with environmental concerns associated with managing natural forests. Simply put, more wood can be grown on less land.

The Forestry Division's tree improvement programs focus on Acadian forest tree species. Black spruce, white spruce, red spruce, white pine and eastern larch are selected for their lumber producing quality, and balsam fir is selected for its Christmas tree potential. Scions from selected trees are grafted onto root stock at the J. Frank Gaudet Tree Nursery, and then held until they are ready for outplanting in first generation orchards (about 1.5 years). Tree Improvement staff make sure the parent tree is sexually mature, so these grafts will usually produce cones in about four years, instead of the 12–30 years for trees grown from seed. Other Tree Improvement programs include testing provenances of non-native tree species to determine their potential as reforestation species on PEI.

So next winter if you happen to see someone clipping the tops off a very tall tree deep in an Island woodlot, it just might be someone from Tree Improvement helping to create a more productive forest. ❖

Prescription harvesting: A stand-level tool

Chris D. Smissaert, RPF, Chief Forester, SilviCrew Limited

At the end of 1994, as the paint was drying on the wall over the end of the FRDAs, it seemed to be bringing an end to forestry research. Here in New Brunswick, the Forest Research Advisory Council (NBFRAC) has ceased to function for the time being. While it was still alive, the wildlife technical committee developed a new tool for harvesting prescriptions in deer management areas.

Phase 1 of this project included:

- a review of silvicultural guides,
- a glossary of terms, and
- a bibliography.

Phase 2 included discussions and definitions of:

- management objectives,
- silvicultural systems and prescriptions, and
- basic stand structural information to be collected during the precut survey for use with the key.

The final phase of this project brings it all together as a package, entitled "Towards the Development of a Silvicultural Key for Mature Softwood Stands."

The introduction reviews the project objective: developing a methodology for prescribing harvest operations at the stand level. Central to this objective is to identify stands suitable for treatments other than clearcutting, setting management objectives, silvicultural systems, and writing suitable prescriptions.

The package describes a one-person, precut cruise methodology, sampling basic overstorey and the understorey structural data. Various other data is deemed to be required by the manager including, for example, operational parameters such as terrain and tree lean, and/or wildlife activity status conditions. For the overstorey conditions, the field tally sheets summarize the volumes of the various species by product (size) and associated stability classes. This is for use with the silvicultural key, and the cut pecking order directives on the prescription form. For the understorey, the field tally sheets record the regeneration status for use with the silvicultural key, and regeneration protection directives on the prescription form.

The next step is use of the silvicultural key to generate an appropriate silvicultural system. Each decision node is based on either management objectives or information obtained from the summarized field tally sheets. The thresholds for the decision nodes within the key are based on the reviewed literature and investigations during this project.

The final step of the prescription harvesting method is the prescription form. At the operations level, the generated silvicultural system becomes the actual prescription. The manager records the selected silvicultural system as generated by the key and the management objectives at the top right of the form.

Next, the stocking of the advance regeneration and the decision for

protection measures is selected, and the summary of the stand area and selected overstorey conditions are transferred from the tally sheets. From this and the actual summarized tally sheets, the manager prescribes a species cut pecking-order with volume removal rates.

For commercial thinning, shelterwood cutting and selection cutting, the basal area and number of trees per hectare are transferred from the tally sheet for use with a stocking chart.

The Appendices include the New Brunswick Department of Natural Resources and Energy (DNRE) stage and volume table, and the estimated volume by height table. A spruce-fir stocking chart form is included, and finally, a discussion of windthrow hazard from DNRE's "Field Guide to Forest Site Classification." All of these are desirable associated information.

As with the development of any tool, use and refinement in the hands of a forest technician or forester are needed to meet each user's specific needs. The report "Towards The Development of a Silvicultural Key for Mature Softwood Stands in New Brunswick" is available from the author at (506) 459-1491. ❖

Production de plants: Une baisse en 1994-95

La production de plants forestiers, en 1994-95, a baissé par rapport à l'année précédente, tel qu'on peut le constater dans le tableau ci-joint. Notons la disparition du'n producteur, parmi la liste que nous avions publié l'an dernier, soit la Coopérative forestière Haut Plan Vert, qui ajoutait quelque 400,000 plants au total de 1993-94.

L'an dernier, les producteurs de plants forestiers se sont rémis en association provinciale, lorsque le MRN a modifié le mécanisme d'appel d'offres. Certaines régions, comme le Saguenay-Lac-Saint-Jean, ne sont pas sorties gagnantes de ce nouveau système d'attribution des contrats.

Au moment de mettre sous press, le MRN s'apprêtait à retourner en appel d'offres pour les nouveaux plants à être mis en production pour les prochaines années de reboisement. On sait déjà que d'autres producteurs, qui apparaîtront encore dans les statistiques de 1995-96 ne seront plus sur la ligne de départ. On n'a qu'à penser aux Serres coopératives de Guyenne, qui ont décidé, au courant de l'année 1995 de quitté ce secteur d'activité.

Production en 1000 plants

Region	1994-95	1993-94
Bas-Saint-Laurent	30616	40488
Saguenay-Lac-Saint-Jean	32080	30003
Québec	11804	14808
Mauricie-Bois-Francs	14013	15349
Estrie	9473	15207
Outaouais	6396	5568
Abitibi-Témiscamingue	26310	33874
Côte-Nord	8064	11059
Gaspésie-Îles-de-la-Madeleine	8752	8572
Chaudière-Appalaches	8033	11306
Lanaudière	3654	5396
Laurentides	12796	17274
Totale	**171991**	**208904**

English summary

A summary appears on page 23.❖

More than a change of heart is needed to preserve Ontario's boreal forest

T.J. Carelton, Associate Professor of Forest Ecology, University of Toronto

Note: This article is an edited version of an article printed in the Globe and Mail, *Aug. 1, 1995, in response to an editorial , "In Defence of Clear-cut Logging," July 14, 1995. It is reprinted with the author's permission.*

Most of the newsprint pulp in North America derives from spruce forests of the Canadian boreal region. The Canadian boreal forest provides the raw material for the *Globe and Mail*'s printing presses.

Canada is home to 26% of the world's boreal forest, which covers 11% of the Earth's terrestrial surface. This geographical fact makes it important that we in Canada, a liberal and technologically developed nation, engage in ecologically sustainable forest practice.

This is important, not only for our own future, but also as an example to developing countries and to Russia, which is currently eyeing up its enormous boreal forest resource as a means of earning hard currency.

A *Globe and Mail* editorial stated, "In fact, if conducted properly, it [clearcut logging] is a safe, efficient and ecologically sound method of cutting trees in Canadian forests." Efficient and safe maybe, but ecologically sound? Says who?

The published scientific articles from graduate-student theses written in my laboratory have examined a total of 262 spruce forests in Northeastern Ontario that have been clearcut logged once, at some time since such logging started in the early 1920s.

Of these 262 forest stands, only eight (3%) have regenerated to become spruce-dominated ecosystems again. The comparable figures for forest-fire disturbance would be 90 to 100% regeneration to spruce dominance.

...of the 262 forest stands, only eight (3%) regenerated to become spruce-dominated ecosystems again...

Planting efforts do not improve things much. Two-thirds of the spruce plantations in the Ontario boreal forest fail because of competitive suppression by broad-leaved shrubs and trees. Only with expensive and/or environmentally unacceptable herbicide applications can this situation be somewhat improved.

The spirit of the *Globe and Mail* editorial, that a willingness prevails to cut trees in a more environmentally sensitive fashion than in the past, is well taken. Indeed, in Ontario there is a new, strong will on the part of the Ontario Ministry of Natural Resources to manage the complete forested landscape rather than just the timber resource. Unfortunately, more than a change of heart is needed. The solutions are not straightforward, and they will almost certainly require an abandonment of large feller-buncher machines on tracks.

These are the main creators of oversized clear-cuts, which are still the norm in Northern Ontario. Such heavy machinery badly disrupts the forest floor and changes the site conditions, militating against spruce regeneration.

Scientific research is required into viable alternatives. Most official research activity is geared toward achieving regeneration on such mechanized clearcut sites. This might be dubbed "after-the-fact research," because it accepts that large clearcuts must prevail.

Unofficial research activity is also proceeding in which low-impact, small-scale logging effects are examined for their ability to sustain continuous forest regeneration. Many such trials are conducted by community forest operations in which government agencies and big business play no direct role.

Community forests attempt to sustain local communities as a source of income and employment. Consequently, there exists a stronger vested interest in achieving forest regeneration than in large-scale industrial forestry. Which of these initiatives is the most successful has yet to be seen.

Industrial forestry has been around for some 70 years in the Canadian boreal region. Despite this history, the industry has yet to prove to the Canadian people that it can harmonize its activities, with the ecological capacity of all but a limited portion of the boreal forest landscape, to regenerate and grow back to something approximating its original state. ❖

Ontario developing new free-to-grow standards

John Lawrence, Director OSCA

As part of its re-vamping of forest policy, which includes the new Crown Forest Sustainability Act, the OMNR and the government of Ontario has committed to developing new standards to assess free-growing regeneration. These standards are crucial to the sustainability of the forest for all users, and are vital to the development of the silviculture industry in the province. Without clearly defined and enforceable standards, it is impossible to accurately assess and measure silviculture practices and the subsequent regeneration performance. Loose targets and improper selection of the parameters to be measured could allow poor silviculture practices to appear to be providing acceptable results.

...the focus will be on the number of free-growing trees per hectare rather than the stocking percentage...

At a time when more and more power to manage the forests is devolving to industry, it is in the best interests of all concerned to get an effective new system in place. Unfortunately, the most current discussions on this matter took place more than a year ago, so it would seem unlikely that anything will be in place soon. Nevertheless, the process does seem to be leading toward some important changes.

First of all, the focus will be on the number of free-growing trees per hectare rather than the stocking percentage. In practice that will likely mean a target somewhere in the range of 800 to 1200 stems per hectare at maturity. Secondly, free-growing criteria will be based on a management unit or site-specific level, given the management objectives for that site. Presumably, these criteria will still take into account regional objectives for the boreal forest, mixed wood stands and so on.

In addition, minimum heights will be established for acceptable species. However, this will have to take into account the productivity of the site among other factors. For example, species on highly productive sites may reach a given height quickly while at the same time be subjected to greater competition from non-target species.

...continued on page 50

Restocking BC's real NSR by the year 2000

Dirk Brinkman

MOF has been instructed by the BC government to recalibrate the NSR Planting Program. This program's goal was to have all NSR areas restocked by the year 2000. The idea of restocking the NSR by 2000 was a WSCA initiative (see 1988 issues of the *WSCA Newsletter*) that was taken up in 1988 by the Social Credit government.

At that time, the MOF netted-down BC's total NSR of 3.7 million hectares to a more affordable target of about 735,000 hectares of accessible and economically viable sites. MOF then estimated that half the netted down area would restock naturally by the end of the millennium, reducing the area targeted for planting to less than 10% of the original NSR.

Here we are eight years later in 1996. The NSR replanting program is supposedly ahead of schedule. But BC's predicted harvest "fall-down" is here and deepening. Every hectare that can grow trees is needed to increase the land base on which the AAC is calculated. Both the forest industry and the MOF are tackling regeneration problems with an unprecedented seriousness.

Know of any NSR?

At the recent Western Silviculture Conference, MOF advised the *CSM* that it will add any unstocked areas identified by silviculture contractors or field technicians to the final push to restock all of the NSR by the year 2000.

If you know of such an area, let MOF know, and please also send the information to *CSM*. We will ensure that the type of NSR identified is communicated to the industry, so others that are similar can be identified by readers.

...the MOF "netted down" BC's total NSR of 3.7 million hectares to a more affordable target of about 735,000 hectares of accessible and economically viable sites...

NSR not on the books can include historic failures; plantations that are on the books and "surviving" but are stagnant and will never reach free-growing; areas out of sight and out of mind; areas logged and forgotten, or destroyed by wild fires or insects; blow downs; etc.

Each district office has a record of their local original NSR and how they netted it down. If you know your area well, review the net down to ensure it reflects the stocking that is out there.

Let's make the reforestation of the backlog by the year 2000 a total success.

Leaving your mark

Bill Grainger, EBA Engineering Consultants Limited

Note: This is an edited version of a letter to Dirk Brinkman, Feb. 14, 1996.

We were doing some terrain mapping in Furry Creek – up the Squamish highway – and my mapper came to me and asked what I thought this squared-off feature was (see aerial photo right).

My interpretation was that a planting crew, at the end of a contract, bagged out and didn't quite make it to the back of the run. What do you think? How would this be explained on a regen survey?

Did you plant in Furry Creek by any chance about 15 to 25 years ago? Just goes to show how what we do leaves a lasting record on the landscape – usually in a positive way – like the rest of this plantation.

The mark of NSR

Dirk Brinkman

Note: This is an edited version of a letter to Bill Grainger.

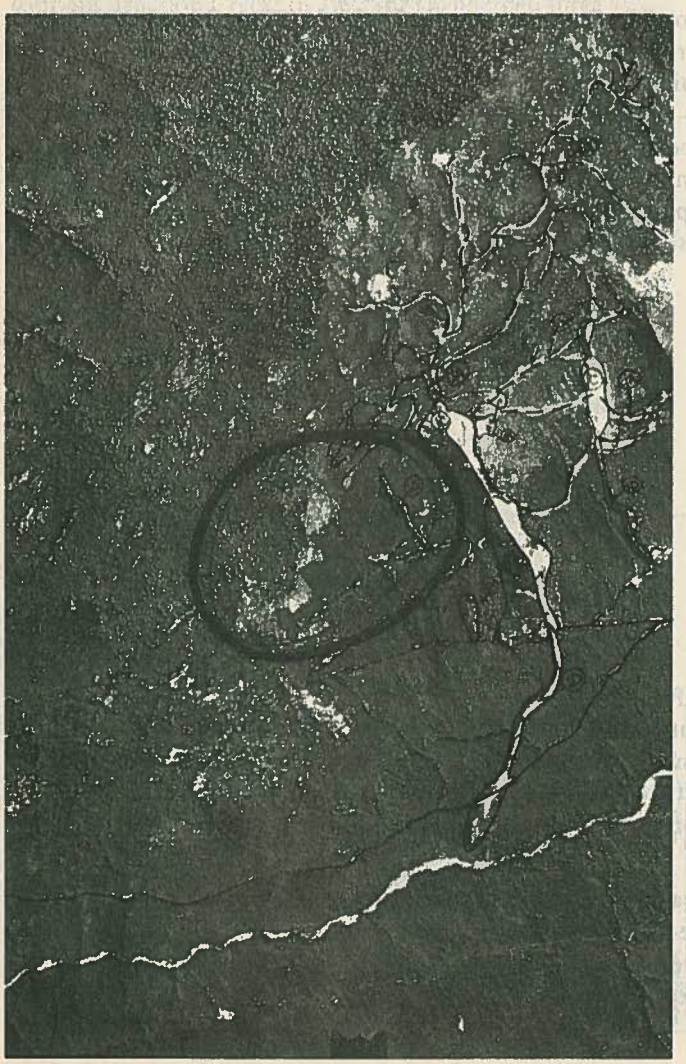
Aha, you've found NSR! I would suggest that the squared top of the area reflects the original boundaries of a logging block, which was properly planted as per the planting contract boundaries that typically conform with the logged area. The uphill unstocked portion is

probably an "escape" from the slash burn, which 15 to 25 years ago, would seldom be planted.

These three fire escapes are unusually large, however, and represent an important feature of the forest land use "end game". MOF Silviculture Branch has been given renewed instructions to complete the restocking of the NSR by the year 2000, to which the unplanted escapes from the slash burning need to be added.

In the context of the current reductions of the AAC, the "good enough" attitude of past planting needs to be revisited.

Whatever, the original cause of these unstocked areas, this is a good candidate for MOF's revitalized "Restocking BC's NSR by the year 2000" program.❖



Were BC's floods this year just a flash in the forest?

Stephen Hume

Note: This article is an edited version of two pieces appearing in the Vancouver Sun, *Feb. 5 and 7, 1996.*

Is clearcut logging responsible for flooding, erosion, land movements and muddy Vancouver drinking water? Or were these events going to occur anyway, forest cover or no forest cover?

The debate rages. Patrick Moore, the ex-Greenpeacer who's now point man in the timber lobby's aggressive spin campaign, is of the "slides happen" school. He argued recently in the *North Shore News* that those slides up in the Capilano and Seymour watersheds had nothing to do with logging.

Moore cites a three-year study in the Seymour watershed that recently concluded that logging was a contributing factor in just five of 1,200 landslides. The Capilano slide was on a slope logged near the turn of the century, and had experienced a number of slides in the past before sliding again in the heavy rains of late 1995.

"To claim that logging is responsible is an affront to common sense." What's more, he points out, such patterns are normal in nature and landslides can actually be good for the environment, contributing to biodiversity by creating openings in the coniferous canopy for deciduous trees that wouldn't otherwise get a chance to flourish.

Vicky Husband of the Sierra Club of Western Canada, who comes at this with an entirely different spin, points an accusing finger at the west coast of Vancouver Island. Even usually cautious, provincial environmental authorities are now describing recent slide damage in logged areas there as "incredible." True, the rainstorms were exceptional. Some places got a foot of rain in half a day.

Is this a once-in-a-hundred-years event that won't happen again before the end of the next century? Possibly. But what if it's the emerging norm as a result of global warming? Certainly some legitimate scientists — James Hansen, director of NASA's Goddard Institute for Space Studies, is one — predict that as the planet warms up from the greenhouse effect, we should see increasing extremes in the hydrologic cycle. Dry areas will get longer and more intense droughts, wet areas will experience heavier precipitation

...what does the future hold for steep, clearcut slopes if the once-in-a-century rains turn out to be the yearly event...

What does the future hold for steep, clearcut slopes if the one-in-a-century event turns out to be the yearly event? What are the implications for fish and wildlife? What are the implications for the forest industry itself?

On the west coast at least 260 slides, flash floods and bridge or culvert washouts have now been documented following heavy rains earlier this year.

Sixty-four percent of these events occurred in previously logged areas — often on slopes of 30 degrees or more — or along logging roads. Another 21% involved debris torrents into streams and rivers. In some cases, entire logged hillsides slid into lakes, rivers and valley bottoms. Only about 14% occurred in unlogged old-growth forest.

Officials say those areas in Clayoquot Sound governed by stringent new logging practices were not affected by the landslides. Does this imply that the logging practices standard everywhere else do tribute to erosion, stream degradation and land movements?

The forest industry is understandably quiet about this, although it is coughing up $5 million to help restore the ravaged San Juan River watershed — mind you, no matter what they do for that river it will probably take a century for the streambed to stabilize.

Which raises another question. If there is a direct association between logging activities and the arrival of deleterious substances such as silt, gravel and old-logging slash into fish-bearing lakes, streams and rivers, where are the federal fisheries authorities?

The federal Fisheries Act is pretty clear about deleterious substances and the penalties for causing them to be introduced into fish habitats. When it comes to First Nations attempting to exercise their aboriginal rights by catching salmon, the fish cops seem to be everywhere. When it comes to gigantic corporations whose activities contribute to the trashing of spawning habitats for entire runs, the enthusiasm for enforcement seems to wane.

On the other hand, maybe the government simply agrees with the argument that clearcut logging and damage to habitat aren't connected.

What to make of these decidedly opposed points of view?

Wendy Kotilla is involved in one of the most fascinating scientific undertakings in BC. The Carnation Creek Project is a long-term study of the impact of logging on a typical coastal watershed. On the far west side of Vancouver Island, it supports chum, steelhead and cutthroat trout. The research began 25 years ago, and has generated 154 scientific papers.

The Carnation Creek Project has been scaled back but baseline monitoring and research continues. For six years, Kotilla has been living here most of the year, recording weather and stream levels, maintaining the traps where the fish are counted, collecting biopsies from dead spawners, and repairing the trails and bridges. School groups have also been turning up in increasing numbers for an educational tour of Carnation Creek. In 1993 she shepherded three classes of kids, and in 1995 it was up to 19.

The day I walked the stream with her, she told me about the debris torrents that originated in upstream clearcuts, the pea gravel marching down the river, the thick layers of silt that signal eroding banks. Before logging, 4,000 chum spawned here. This year, Kotilla counted just over 100. The Coho are down to six males and one female. The cutthroat trout are showing deformities.

There are important lessons here for those who argue that clearcut logging is benign. "I'd like to see more loggers here," says the woman who gives Carnation Creek its voice. "I'd like to see more industry people and more engineers."

Why, one wonders, won't they go? ❖

MOF will expedite early payment discounts

Larry Pedersen, Chief Forester of BC

Note: This article is edited from a letter sent to WSCA Director Chuck Emery, Nov. 29, 1995.

The MOF makes payments to contractors in accordance with the Financial Administration Act and the province's payment practices. The ministry strives to pay all contract invoices as close as possible to 30 days of receipt of the invoice or service, whichever is later. Contract invoices offering an early payment discount are expedited if the discount amounts exceed the cost of "fast tracking" the payment as well as foregone interest.

Discounts can represent a substantial savings to government. Therefore, the ministry generally attempts to accept any discount when it is cost effective to do so. Discounted invoices are processed through the local government agent, so that faster payment is assured.

Government policy pertaining to early payment discounts has not been rescinded. Since April 1991, the acceptable discount rate for early payment of invoices has been 2% or greater. Ministry staff will be informed of the benefits of processing early payments and of the continued existence of this option.

BC silviculture contractors are an extremely valuable resource, and assist in fulfilling the majority of the province's silviculture goals. Contractors have responsibilities to meet payroll obligations. The MOF must, therefore, adhere to committed dates for payment on a consistent basis, thereby enabling contractors who receive payment from government to plan their cash inflow.

For more information, contact Sherman Long, Manager, Expenditure Operations, Financial Management Branch, at (604) 387-6670. ❖

E R R A T U M

There was a significant error in the table on page 23 of the Winter 1996 issue of *CSM* which accompanies Joyce Murray's article, "FRBC policies short-change BC's forests." The figures given for Scenario #4 were wrong. *CSM* apologises for the error and any confusion it may have caused. The complete corrected table is reproduced below for your information.

Sample Scenarios for 5 Year FRBC $1,000,000,000 budget

Scenario	$/day	units/ day	unit price	wage/ day	total # of units treated	worker days direct	worker days indirect	Total direct & indirect jobs
1. Established firms	$300	1000	0.30	$180	3,333,333,333	3,333,333	1,111,111	4,444,444
Notes: competitive pricing Expense breakdown: Labour 60%, Expense, 35%, Profit 5%								
2. Subsidized firms	$300	660	0.45	$150	2,200,000,000	3,333,333	733,333	4,066,667
Notes: Inexperience = lower production; learning and inefficiencies = higher expenses Expense breakdown: Labour 50%, Expense 35%, Learning/inefficiencies 10%, Profit 5%								
3. Subsidized, monopoly	$300	660	0.45	$141	2,200,000,000	3,333,333	733,333	4,066,667
Notes: Monopoly pricingñ supplier earns above normal profits Expense breakdown: Labour 47%, Expense 35%, Learning/inefficiencies 10%, Profit 8%								
4. Ex- forest industry	$383	660	0.58	$180	1,723,333,333	2,611,111	574,444	3,185,556
Notes: Organized Labour same as Scenario 3, but higher wage floor ($180/day) Expense breakdown: Labour 47%, Expense 35%, Learning/inefficiencies 10%, Profit 8%								

Assumptions

50% of FRBC budget ($200 million/year)is invested in forest enhancement
Subsidized firms achieve 66%productivity (Forest Worker Development Program only 33%)
Indirect Worker days are created immediately in forest from silviculture treatment.
Every 3000 treatment units create one indirect worker/day from the forest benefits of the enhancement
The inefficiencies of #2-#4 remain due to subsidy dependency and turnover.

Conclusions:

Scenario #1 creates 1,258,889 more work days of employment than Scenario #4 and treats 52% more units than Scenario # 4.

...continued from page 43

What will perhaps be one of the most crucial aspects of any revised system will be the timing of assessment of free-to-grow status. In the old system, which is still widely used, it was desirable to declare areas free to grow as quickly as possible in order to have them return into the productive land base inventory (an interesting topic in itself). The province is now proposing a switch to management on a volume basis wherein the old methodology is irrelevant. Hectares would no longer "disappear" between harvest and declaration of free to grow. With a volume-based approach it is only through maintaining or increasing yields on regenerating lands, that the allowable cut is maintained or increased.

The timing of free-to-grow assessments is at least as important as the measurement criteria. The future volume potential, stand structure, and the "forest" values are all tied in with an accurate measure of the free-to-grow status of regenerated lands. It will be unacceptable to assess an area as free-to-grow so early that the results are unreliable.

Free-to-grow standards are fundamental to forest management and will prove critical in efforts to attain certification through the ISO, FSC, or CSA processes. Moreover, the development of effective new standards in Ontario provides an excellent opportunity to reinvigorate forest management practices in this province. ❖

To list your event, please send your correspondence to:
Canadian Silviculture Magazine,
Box 65506, Station F, Vancouver, BC, V5N 5K7
or fax (604) 875-1403.

Ecosystem management: principles and operation
This five-day workshop will cover the concepts and applications of hierarchical landscape ecology, including: holistic watershed management, coarse- and fine-filter approaches to biodiversity.

Theme: Hierarchical landscape ecology
Location: Pullman, Washington
Date: May-13-17
Contact: (509) 662-4315

Canadian Wood Council AGM
The focus of this year's AGM is using the information highway to communicate with your customers.

Theme: Wired for success
Location: Edmonton, AB
Date: May 13-14 1996
Contact: (613) 247-7077

Forest Expo '96
Trade show with an international focus features seminars and live-action equipment demonstrations.

Location: Prince George, BC
Date: May 9-11, 1996
Contact: (604) 563-8833

Wood conference '96

Theme: Profit in processing, Island style
Location: Courtenay, Vancouver Island, BC
Date: May 31 - Jun 2, 1996

FOREXPO: Biennale de la forêt de Gascogne
ForExpo is southern Europe's biggest forestry show. The 18th bi-annual event is returning to Les Landes– France's leading forest region– with more than 250 exhibitors and thousands of forestry professionals.

Theme: Towards the cultivated forest of the 21st century
Location: Soustons, France
Date: June 5-7, 1996
Contact: (416) 777-9658

Council on Forest Engineering 19th Annual Meeting
This year's conference will focus on sustainable forestry, green certification, occupational regulation of loggers, and best management practices compliance.

Theme: Planning and implementing forest operations to achieve sustainable forests
Location: Moncton, NB
Date: July 29 - Aug. 1, 1996
Contact: (906)482-6303

Canadian Institute of Forestry Annual Meeting
The 88th CIF AGM will feature concurrent workshop sessions, trade show, field trips and a family entertainment package.

Theme: Global influences and local realities
Location: Thunder Bay, ON
Date: Aug. 19-21, 1996
Contact: (807) 344-5190 ❖