


CANADIAN SILVICULTURE MAGAZINE

VOL.5 NO.2

SPRING 1997



in this issue:

**Planting spot selection
for successful regeneration**

**Planning for
sustainable harvest
levels in BC**

**Western Silviculture
Conference round-up**

**plus regional
silviculture reports
avec résumés
en français**

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Easter Island: An important resource history lesson for today

Dirk Brinkman

Last year I had the pleasure of travelling through the giant farm that stretches from Stockholm to the Mediterranean called "Europe", dotted with its many little and large cities, while reading Clive Ponting's *A Green History of the World*. As I read his documentation of the shift from hunter/gatherers to organized agricultural societies in Asia, Europe and Meso America from 7500 BC to today, it was fascinating to visit the most dominant culture of the past five hundred years.

In each of the societies Ponting describes, the agricultural innovation of the domestication of uplands rice, wheat or corn was followed by the organizational innovation of a city-state. An agricultural population of 95% lived near starvation, with "high infant mortality, low life expectancy, chronic under nourishment, and the ever-present threat of famine and the outbreak of virulent epidemics." This population supported the 5% religious, military and civil administrators. European technology changed this trend in the last two centuries. (Ponting's documentation of the exploitation of local ecosystems and their consequences is even more thorough than the excellent book *The Role of Wood in the History of Civilization*.)

Ponting's *Green History* begins with the lesson of Easter Island. When Europeans first visited Easter Island in 1722, it was completely treeless, with a society living in reed huts and caves, engaged in almost continual warfare and resorting to cannibalism to supplement their meager food supplies. At first, the presence on the island of over 600 statues that required a socially and technologically advanced society was considered a mys-

tery, and conjectured to be the product of a previous civilization or other strange influences.

Archeological analysis shows that twenty to thirty Polynesians arrived in the fifth century, and began what appears to

Pollen analysis shows that at the time of the initial settlement, Easter Island had a dense vegetative cover, including extensive forests.

initially have been a leisurely life that gradually evolved to the most advanced Polynesian culture, including *rongorongo* (the only form of written Polynesian), sophisticated astronomical alignment in hundreds of *ahus* or stone platforms, and carved and moved stone statues weighing several tons each.

It appears that the population grew steadily for a thousand years to about 7000 to 9000 people until 1550, when suddenly the society collapsed. Hundreds of platforms and over 300 stone statues were left half complete.

Pollen analysis shows that at the time of the initial settlement, Easter Island had a dense vegetative cover, including extensive forests. Deforestation began about 950 and, by 1600, the island was almost completely deforested. This was not only the death knell of an elaborate social and ceremonial life; it forced people to gradually abandon timber homes and live in caves and reed huts; canoes could no longer be built for fishing, and nets no longer be made from the paper mulberry

tree; soil erosion reduced crop yields until the only source of food was chickens. In the subsequent wars, most *ahus* were destroyed, statues pulled down, and slavery and cannibalism predominated. The first Europeans were confronted

with massive statues scattered over a treeless island and a population that could not remember how these statues had gotten there. This was a mystery.

The Easter Island mystery is gradually

being revealed by researchers as an important resource history lesson. Ponting's ambitious scholarly text shows us that this pattern of history has been repeated many times, sometimes in places where people could move onto other lands or crops, sometimes in periods of change through innovations like wet-land rice or deep plowing.

Ponting does not judge whether "modern industrialized societies, with their high rates of energy and resource consumption and high pollution levels, and the rapidly rising human population in the rest of the world, are ecologically sustainable." Instead, he graphically shows us how we arrived at having "an almost insuperably difficult set of problems to solve," in a world reaching the limits of its resources, isolated in a vast ocean of space, and seeming more and more like Easter Island. ▲



Comments out of context

Dear Editor:

I would like to respond to your article, "Ontario ministry, forestry program gutted," in the Fall '96 issue.

Mr. Murray's comments regarding Buchanan Group's Lac Seul Forest Management Agreement (FMA) are both out of context and out of date. Mr. Murray indicated that the audit of the Lac Seul Forest stated that "only 40% of the planned regeneration took place." He fails to mention that in the previous paragraph of the audit, only 55% of the planned harvest took place. For the planned renewal targets to be achieved, the planned harvest levels must also be achieved. Also, this audit referred to a period from ten years ago until five years ago—our first audit after signing the FMA. The company has progressed substantially over the past five years, and has satisfied all the requirements of the Ontario Ministry of Natural Resources from this audit.

Glen Niznowski, Divisional Forester
McKenzie Forest Products
Sioux Lookout, ON

Answers, please

Dear Editor:

In the Fall '96 issue, the article "Efficiency or unemployment?" stated that "Sweden went from 100,000 forest workers in 1980 to 10,000 in 1990, and cut the same amount of wood." I'm curious to

know where you obtained this information. As well, when you say "forest workers", does that mean strictly working in the forest or does it include other parts of the Swedish forest industry?

Darrell Wharton
Edson, AB

For the record, statistics from the Swedish government publication "Labour Force in Forestry" shows employment in large-scale forestry declined from 40,400 in 1972 to 9,164 in 1995, and employment in small-scale forestry declined 29,650 to 16,825 in the same period. These declines are primarily due to mechanization.

Valuable article

Dear Editor:

I wanted to compliment you on Mike Cruickshank's and Duncan Morrison's article on *Armillaria* in the Winter '97 issue. I am a logging engineer who has worked in BC since the early '80s. Much of my work is in the BC Interior where I have been trying to come up with steep slope harvesting systems that meet economic, silvicultural, and visual concerns. Your article was extremely valuable in that it was clear, concise, and timely to my work. Thank you and I wish you continued success with your publication.

Stephen Aulerich, PE
Forest Engineering Inc.
Corvallis, OR

Omission

Dear Editor:

Outland Reforestation Inc. seems to have been omitted from your national listings. We have been active in Ontario for the past twelve years and are currently the largest silvicultural contractor in the province.

Our areas of specialization include treeplanting, pruning, thinning, brushing and weeding, GPS surveying, watershed restoration and erosion control, and ground spray.

We enjoy your magazine, and it is read closely by our office. If you could correct this oversight, it would be greatly appreciated.

Dave O'Connor and Jeff Taylor
Outland Reforestation
Toronto, ON

CSM would like to apologize for this omission. While we cannot make a correction to this year's print version of the directory, we will be adding Outland Reforestation to CSM's Online 1997 Silviculture Directory.

Correction from last issue

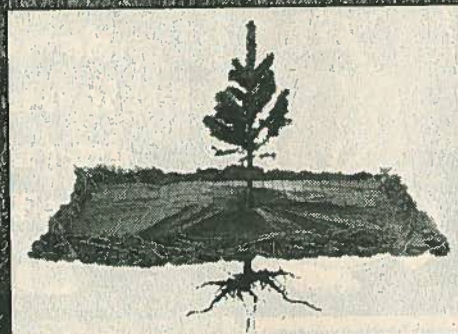
LUSTR Co-op is not affiliated with Lakehead University. The organization can be reached by phone at (807) 623-1397, by fax at (807) 623-4271, or by e-mail at <lustr@baynet.net>.



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Alarming stats for Maritime woodlots

The issue of private woodlot management has become a sleeping giant in Maritime communities. While management of Crown lands has steadily improved over the past 20 years, alarm bells are sounding about the long-term survival of private woodlots.

Representatives from various Maritime stakeholder groups heard some alarming statistics at meetings held in May and November 1996, and in February 1997. According to the NRTEE's Private Woodlots Task Force, fewer than half of the region's harvested woodlots are being managed sustainably; fewer than 10% are being run according to a formal management plan; and the level of over-cutting is currently estimated at 130% of sustainable yield. If this trend continues over the next 20 years, a 60% reduction in volume will be required for the two decades that follow.

This information prompted meeting participants to agree that:

- Private woodlots are under enormous pressure from private logging contractors, whose aggressive harvesting prac-

tices are driven by high regional unemployment, and the cost of owning and operating costly mechanical harvesting equipment.

- Market forces have a significant impact on harvesting practices. If production of the region's forest products is to be held at sustainable levels, the industry must accommodate consumer demand and meet its financial objectives, while reducing the annual cut.
- In an interconnected regional economy, provincial governments will have to work together, to avoid exporting problems in the woodlot industry from one Maritime province to another.
- Existing tax regimes serve as a disincentive to sustainable harvesting practices.
- With the loss of funding for the federal-provincial FRDAs, private woodlot operators have fewer incentives to carry out silviculture on their lands. A new system is needed that will generate funds for sustainable forest management.
- Woodlot owners who have chosen not to harvest their timber stands will face relentless commercial pressure as the resource's sustainability declines.

- Finally, better management of private woodlots is consistent with an international trend toward certification of sustainable forest products. Increasingly, competitiveness and access to global markets will depend on the industry's ability to meet an emerging international standard for sustainable practices.

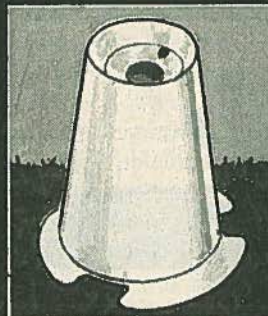
Seedlings prefer old-growth sites

A University of British Columbia botanist has raised eyebrows by suggesting his work on tree nutrition might have dramatic implications for reforestation efforts.


Herbert Kronzucker, whose findings are published in the science journal *Nature*, has found spruce seedlings have a preference for a form of nitrogen known as ammonium, common in old-growth forests. They shun nitrogen in the form of nitrate, which he says is more common in clearcut areas. This suggests to Kronzucker that many young trees are not getting the proper nutrients.

Vancouver Sun

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Global picture bleak

Five years after the Earth Summit, with all its promise for attacking global ills, forests still disappear, the air is murkier than ever and the population is up by almost a half-billion people.

Worldwatch Institute paints a bleak global landscape in its recently released annual *State of the World* report. Governments lag badly in meeting the goals set at the Rio de Janeiro summit, Worldwatch said in its global review. "Unfortunately, few governments have even begun the policy changes that will be needed to put the world on an environmentally sustainable path," the independent institute stated.

Worldwatch documents problems with food supply, crop-land depletion, chronic disease, loss of species, climate change, and political instability.

Among Worldwatch's gloomiest conclusions: millions of hectares of tropical and deciduous forests still disappear each year, carbon-dioxide emissions are at record highs, and population growth is outpacing food production.

Worldwatch identified a disparate group of eight "environmental heavyweights"—China, India, the United States, Indonesia, Brazil, Russia, Japan and Germany—it said must lead together

because they have the greatest impact on the planet's health, accounting for more than one-half its population, forests, and carbon-dioxide emissions.

Vancouver Sun

Logging threatens caribou

Logging rates in the Chilcotin region of west-central BC are jeopardizing one of the province's most important caribou herds, according to BC Wild, a Vancouver-based conservation group, and the Guide Outfitters Association of BC, a group representing professional angling and hunting guides. A report released by BC Wild urges the BC government to end clearcutting and roadbuilding in this region's remaining old-growth forests. The report states that clearcutting results in a loss of suitable habitat for woodland caribou for 50 years or more.

Aerial treeplanting

The shrinking of the world's forests has become a problem of desperate proportions, and there seems to be no easy solution. But that may change. A doctoral candidate at MIT is working on a way to reforest vast areas by dropping thousands of seedlings from airplanes. Each seedling would be placed in a cone-shaped, biodegradable container holding

fertilizer and water. Dropped from a plane, it would release the water and nutrients.

Herald Tribune

Habitat reduction

The 1996 Red List, produced by the Species Survival Commission of the International Union for the Conservation of Nature (IUCN), marks the first time that the status of each of the world's known mammal species has been determined. The results are alarming—nearly a quarter are at risk of extinction. Previously, the conservation world used the status of birds to estimate the level of threat to all animals, because birds were the only group that had been fully assessed.

The annually updated record of threatened wildlife includes 11% of the world's bird species, 253 reptiles, 124 amphibians, and 734 fish species. IUCN analysts say the most significant threat to the majority of species at risk of extinction is habitat reduction, fragmentation and degradation, resulting from human population growth and economic development.

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New in blankets

Arbortec Industries Limited has improved the thickness of the Cool Blanket — it is now 2 mm instead of 1.1 mm thick — and has added micro-perforation to allow the soil to breathe underneath the blanket. The cross-cut in the centre has been made smaller (5" cut plus a 10" perforation across for larger trees). Cool Blankets are still co-laminated white on black polyethylene, with the white side reflecting sunlight away from the root collar and the black underside inhibiting weed growth.

The Brush Blanket's colour has been changed to a different green to increase the blockage of the light spectrum that facilitates weed growth. The tear-off and cross-cuts have been improved, too, to better assist in installation.

Both blankets come in new waxed dispensing boxes, with staples. Shoulder straps on the Brush Blanket carrier better distribute weight and improve installation time. Fingerless installation gloves, with a mesh backing and padded palms, have been added to the product, too.

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Durable lopper

The Prun-off Lopper has a reputation for speed, strength and durability. The straight cutting blade opposing a curved blade means that branches don't spring out of the gullet, as happens with conventional loppers. Originally designed for radiata pine, the lopper works equally well on Douglas fir and other local species. It is capable of cutting branches up to 7 cm. A full range of component parts and accessories are available, and training videos are in the works.

Contact: Neville Crosby Inc. at (604) 662-7272 or 1-800-663-6733



Brush Blanket held in place by staples in corners and rocks (optional).

Seed drying and separation

To enable nursery workers to maximize the germination potential of a seedlot, Western Tree Seeds has developed a unit combining seed drying and separation principles.

Damp or wet seed can be dried without using heated air, thereby reducing the seed moisture and allowing a density differential to occur. Since living, filled seeds retain moisture for longer periods of time, a more accurate separation is now possible when using the unit's aspirator application. A multi-stage configuration (heavy, medium, light) allows for three separations. By disconnecting the centre tube and plugging off the vacuum port, a two-stage aspiration configuration allows for a heavy/light density separation of seed and/or debris.

Air velocities are adjustable to accommodate a range of seed species and seed sizes. Production rates range from 3.150 kg/hr to 8 kg/hr, depending on the species and degree of cleaning required.

A pull-out side-mounted seed surface dryer provides surface drying for the seed just prior to seeding and/or aspirating. The dryer is designed as a fluid bed dryer, but can be adjusted to become a suction dryer. The unit employs a single/variable speed, full-blowing wet/dry vacuum, and

utilizes air from the room environment. The drying box holds about 1.5 kg of seed.

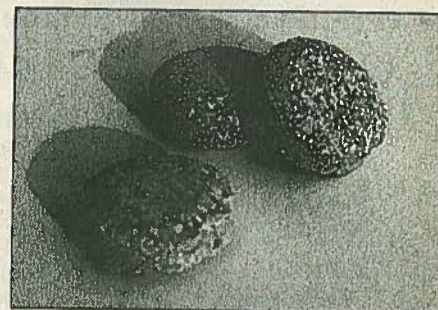
For seedlots where chaff and dust is present, the counter top dryer allows light debris to be drawn into the aspirator and not blown into the surrounding environment.

Contact: Western Tree Seeds Ltd. at (250) 675-2463

Convenient nutrient tabs

Evergro Planting Tabs 20-10-5 provide nutrients to transplanted tree seedlings, even in rainy conditions, and treeplanters can carry them in large quantities. The 10g tabs are applied near newly planted seedlings and pressed into the ground by the heel of a foot. They provide nutrients necessary to the plant's development and will feed seedlings for up to eighteen months. As there is virtually no loss of nitrogen through leaching, the tabs are environmentally safe. A 21g-size tab is also available for feeding established trees or shrubs.

Contact: Westgro Sales Inc. at (604) 940-0290

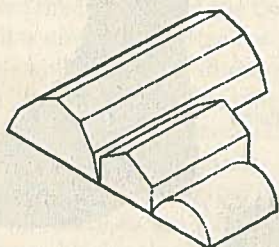


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SILVIBOOKS

Top of the stack

Dave Curtis

Forest Stand Dynamics, Updated Edition

Chadwick D. Oliver and Bruce C. Larson

John Wiley & Sons, USA, 1996, \$42.95

Forest Stand Dynamics describes the various forest-growth patterns from a mechanistic point of view in order to help silviculturists and forest managers understand and anticipate how forests grow and respond to disturbance. This updated edition covers expanded knowledge and recent advances in understanding, as well as the relation of stand and landscape development to other forest values. It includes such topics as sustainable development, ecosystem management, and adaptive management. It provides a philosophical perspective from which to view forests, describes individual tree growth patterns, effects of disturbances, development of stands, and discusses the broad perspective of forest changes over landscapes. This is a book no forest manager should be without.

Seed Ecophysiology of Temperate and Boreal Zone Forest Types

R.E. Farmer

St. Lucie Press, USA, 1996, \$69.95

This is one of the first books devoted to seed reproduction of forest trees from flowering to establishment, with emphasis on the interaction of environment with physiological processes. It provides in-depth coverage of existing literature, and explains seed production, dispersal, and germination as well as the integral part played by water, temperature, light, chemicals, animals, pathogens and aging. *Seed Ecophysiology* is written in an easy-to-read style, making it suitable for both professionals and lay people.

The Grafter's Handbook

R.J. Garner

Cassell PLC, London, England, 1995 (reprint of 1988 edition), \$27.95

A virtual encyclopedia of grafting, this handbook contains all you need to know to propagate plant varieties, substitute one part of a plant for another, join selected plants, repair damage to overgrown stock, invigorate weak plants, and so on. It includes information on compatibility and cambial contact, root stocks, collecting and treating non-scion wood, tools and methods of grafting. It also covers tree-raising in nurseries and grafting of established trees. *The Grafter's Handbook* is written in a concise, straightforward style complemented by photographs and illustrations.

Book picks courtesy of The Forest Shop, PO Box 550, Brighton, Ontario, K0K 1H0;
tel 1-800-668-1345; fax (613) 475-4646; e-mail <mail@forestshop.com>.

Tree Planters' Notes

This quarterly publication by the Forest Service of the US Department of Agriculture, occupies a unique position in forestry literature. Tree Planters' Notes brings the latest research results from the scientists and engineers working on seeds, seedlings, nurseries and reforestation to the practitioners—the nursery managers, reforestation managers, tree farmers, and foresters. In this way, the publication provides a crucial link between the finders of new information and those who will use it. Articles are written in an accessible style and are peer reviewed. The publication covers a range of topics from habitat restoration to seedling physiology, and more.

Available by subscription by calling (202) 512-2233, faxing (202) 512-1800, or writing New Orders, Superintendent of Documents, PO Box 371945, Pittsburgh, PA 15250-7954, USA.

In brief

Several publications, videos and training packages useful for treeplanting contract administration are available for ordering from BC government agencies. The following items may be obtained from the Ministry of Forests, Production Resources, Forestry Division Services Branch, tel (250) 387-6719, fax (250) 356-2093, or e-mail <prodres@MFOR01.for.gov.bc.ca>:

The pamphlet **Putting People First: Minimizing treeplanter's exposure to seedling pesticides** provides the treeplanting community with general information about the use of pesticides on forest tree seedlings, and precautions planters should take to minimize exposure to the pesticide residues sometimes found on forest tree seedlings. Available in French and English.

Nursery to Planting Site: A Team Effort and Seedling Care: Everyone's

Concern are a pamphlet and video designed to inform people involved in reforestation projects of good seedling handling procedures. Information is provided on seedling physiology, commonly encountered stock problems, and recommended corrective actions, as well as important seedling handling considerations from the nursery to the planting site.

The video **Planting Spot Selection: Matching seedlings with microsites** discusses the importance of spot selection in relation to factors such as site conditions, species, stock type, and method of site preparation. The video identifies what to look for on various site types during the SP, to determine the best planting spot selection. Topics covered include SP assessment (i.e., soil moisture, soil temperature, soil nutrients, air temperature, vegetation impacts, species choice, microsite acceptability), post-harvest assessment, site preparation, planting prescription, and planting projects.

The training package **Silviculture Training for Technicians** contains a binder of lessons for each step in planting contract administration. The lessons include checklists, references, contact people, exercises, case studies, and a listing of corresponding training courses.

The information booklet **Minimum Safety Guidelines for Tree Planters** reviews roles and responsibilities with respect to safety, worker's rights, how to prepare for the planting season, common injuries, camp standards, safety advice with respect to transportation, site hazards, safe-work procedures when planting, and WCB requirements. Available in English, French and Punjabi.

Provincial Seedling Stocktype and Ordering Guidelines assists forestry staff in making biologically sound, cost-effective, site-specific, stock-type selections. Included are reference tables and tips for stock type selection and maintenance of stock quality and vigour during the planting process.

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WIRED FOREST

NRTEE web site

The NRTEE web site provides updates on Round Table programs and activities, and complete listing and summaries of all NRTEE publications. These continue to be available through Renouf Publishing, which is also linked to the site located at <http://www.nrtee-trnee.ca>.

Tree conservation information service

The World Conservation Monitoring Centre (WCMC) and the IUCN Species Survival Commission are developing a new Tree Conservation Information Service as part of a three-year project funded by the Netherlands government. The service will provide information on distribution, conservation status, local uses and economic values of tree species worldwide—all with a view to helping in the planning of sustainable forest management and tree conservation. The plants database already holds 90,000 plant name records, of which more than 10,000 are trees. To learn more about this initiative, send a message containing the line: "Request Questionnaire" to request@wcmc.org.uk.

International forestry directory

The forestry e-mail directory on the CFAN web site <http://www.cfan-rcfa.org> contains more than 300 addresses that can be searched by name, organization, or country. The English e-mail directory can be found at <http://www.cfan-rcfa.org/email.addresses.html>, while the French one is located at <http://www.cfan-rcfa.org/email.addresses.fr.html>.

Anyone interested in participating in the directory can send their name, name of their organization/company, country and e-mail address to roper@unix.inforserve.net. Existing participants who wish to make corrections to their e-mail address can also send them to the above address.

Unasylva on the web

Unasylva, the quarterly international journal of forestry and forest industries published by the Food and Agricultural Organization of the United Nations, has a web site located at <http://www.fao.org/WAI-CENT/faoinfo/forestry/unasylva/unasylva.html>.

FPC guidebooks on the net

Guidebooks pertaining to BC's Forest Practices Code may be obtained via the internet at <http://www.for.gov.bc.ca>. Publications include everything from *Lake Classification and Lakeshore Management* to *Gully Assessment Procedure*.

Agroforestry homepage

ICRAF has opened an agroforestry homepage on the World Wide Web. The site features the latest developments in agroforestry around the world. Visit it at <http://www.cgiar.org/icraf>.

If you have a web site that would be of interest to CSM readers, please let us know by e-mailing the address and a brief description to chaos@axtonet.com.



Choosing a site that will get seedlings off to the best start possible

David Lloyd and Ron Elder

In the silviculture industry, our purpose is to efficiently regenerate forests and tend them into revenue producing stands as quickly as possible. Research has shown that seedlings established in "crop tree spots" have the best opportunity to produce a commercial forest in the shortest period of time.

To reach this goal, we must pass several legislated milestones including "freely growing" and "greenup." Failure to meet these standards rapidly can have an adverse effect on our customers and our industry.

"Freely growing" is the first legislated milestone. At this stage, new trees are effectively free of brush competition and the forest is sufficiently stocked to meet provincial standards. The advantages of achieving this standard within five growing seasons are significant financial benefits. Consequently, the ability to attain

this rate of growth is becoming increasingly important to foresters of all levels

Figure 1 shows target growth rates required for a 2+0 415B interior spruce seedling to achieve freely growing status. Height growth rates are similar to the table below. Note that the stem height/ root collar diameter ratio is 45 and the crown height/ diameter ratio is 2 for freely growing seedlings. Also note that the bud number expands by 2 x/ year until the seedling achieves 100 buds, and then increases at 3 x or more per year. The first two years, although showing lower increase rates, are an essential foundation for future momentum.

If the seedling falls backward in the first two years due to poor root development, vegetation competition or physical damage, then five or more years may be required to reestablish effective momentum. During this period of planting

shock, we may lose 200 or more seedlings per hectare per year from our plantation's stocking.

Height growth rates sufficient to achieve five-year-old freely growing plantations could be defined as they are in Table 1. Can such rates be set as our criterion of excellence? The answer is yes. Individual trees within our plantations already achieve these growth rates, and the knowledge is currently present to achieve such rates for at least 80% of our trees. By attention to growth cycles, site location, and planting methods, the above criterion of excellence is a realistic marker for all those involved in silviculture.

Growth cycles

Key to a high growth rate is the skilful coordination of planting with natural growth cycles. Root growth is the most important aspect in the early life of a seedling, as its roots are needed to colonize a balanced, sustaining nutrient supply through a fully extended growing

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Figure 1.- Seedling growth momentum required to achieve five-year-old free-to-grow status

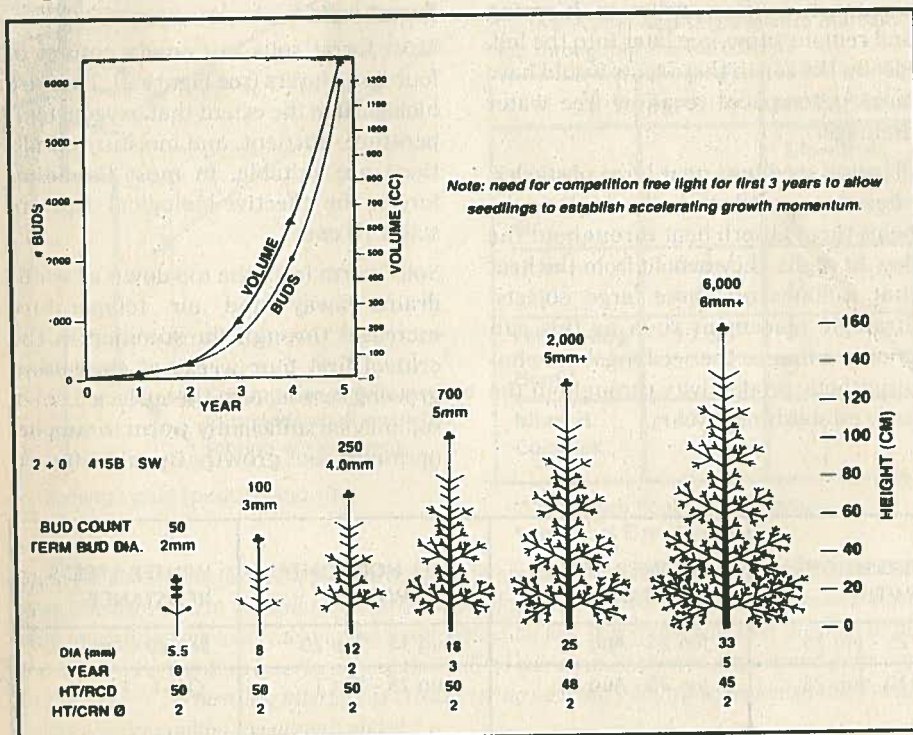


Table 1: Height growth rates sufficient to achieve five-year-old freely growing plantations

GROWTH YEAR	INTERIOR	COASTAL
Nursery	10-25 cm	15-30 cm
1st field yr.	15 cm	15 cm
2nd field yr.	20 cm	30 cm
3rd field yr.	30-50 cm	60-90 cm
4th field yr.	30-50 cm	60-90 cm
5th field yr.	30-50 cm	60-90 cm
Height @ 5 growth seasons	140-210 cm	240-345 cm

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season. In addition, effective root growth is essential to effective top-growth completion in the critical first top-growth year.

Table 2 gives approximate dates and lists the growth phases through which plants progress. Elevation, snow melt, aspect and climatic factors will change the dates somewhat. However, a clear understanding of the sequence and the effect of planting timing is mandatory to obtain sufficient root and top growth momentum.

Effective root growth requires sufficient root-growing degree-hours at the root tips. This is essential to complete the development of tissue from juvenile to mature characteristics and to metabolize the nutrients required for overall plant growth. Often when we excavate trees and compare the stem versus root ages by counting the annual rings in each, we find that the roots are three to five years younger than the tops. When we examine the tree more closely we repeatedly discover that dramatic top-volume increases are directly linked with each incremental root development stage.

Oxygen is the chief nutrient in plants, composing some 44% of their mass. For forest seedlings, the balance is 2% nitrogen, 43% carbon, and 6% hydrogen. Unlike humans, plants have no blood system with which to move oxygen around in their bodies. Therefore, plants must breathe in oxygen at the point of metabolism. For effective root growth, then, oxygen must be breathed in at the root tips.

The ability of a seedling to get oxygen at its root tips is critically important to its long-term establishment. If root tips are damaged or planted in a way that limits the availability of oxygen, such as in wet

areas or finely textured soil, root growth will be inhibited.

Photosynthesis occurs in two stages. First, water is split into hydrogen and oxygen ions, mainly in the mornings. Carbon dioxide is then allowed into the plant through open stomata. When humidity is high, often in the later afternoon and evenings, the CO₂ combines with the hydrogen ions to make sugar. At this stage, oxygen is free to fuel metabolism or to be released to the atmosphere.

Heat

Planting seedlings near large obstacles, often associated with the high spots, helps them absorb heat throughout the day.

A temperature range of 12°C to 25°C is another critical factor required for effective metabolism in plants, both tops and roots. The length of heating time can be extended in the spring and fall, and daily into the evenings by placing seedlings on the highest spots available. These spots become snow-free earlier each spring and remain snow-free later into the fall. Ideally, the soil in these spots would have large pore spaces to allow free water drainage.

Planting seedlings near large obstacles, often associated with the high spots, helps them absorb heat throughout the day. At night, they benefit from the heat that radiates off these large objects. Strategic placement such as this can greatly enhance the seedlings' net photosynthetic productivity throughout the early establishment years.

Oxygen/moisture relationships

The role of oxygen and water are critical to root growth as oxygen is required at the root tips to fuel metabolism, and since nutrients are absorbed through water droplets on the root surface. However, the requirement for heating and air movement within the rooting zone throughout the growth period complicates the roots environmental requirements.

Oxygen, due to the strength of the hydrogen bonds in water, can only pass through water at 1/10,000th of the speed it can pass through air. This fact makes site selection for seedlings extremely important since plants, which breathe and metabolize at their root tips, will asphyxiate in standing water. In short, seedlings planted in saturated soils will be stunted and probably die. Fortunately, a balance seems to occur, for most of the year, in the fermenting layer which has large pore spaces and organic particles.

Forest soils

Most forest soils in Canada consist of four basic layers (see Figure 2). They are biological to the extent that oxygen, temperature, nutrient, and moisture conditions are suitable. In most Canadian forests the effective biological depth of soil is 10 cm.

Soils warm from the top down as water drains away and air temperature increases through the summer. In the critical first four weeks of the spring growing season, only the surface 5 cm of soil may be sufficiently warm to support optimum root growth. By midsummer,

Table 2: Growth cycles

	SPRING HORIZONTAL GROWTH	SPRING HEIGHT GROWTH	SUMMER STRESS RESISTANCE	FALL HORIZONTAL GROWTH	WINTER STRESS RESISTANCE
BOREAL	April - late May	May 25 - Jun 25	Jun 25 - Aug 15	Aug 15 - Sep 20	Sep 20 - April
TEMPERATE	Mar. - mid May	May 10 - Jun 25	Jun 25 - Aug 25	Aug 25 - Oct 1	Oct 1 - March

Selecting a planting site that will maintain good light levels, and ensure little damage or stress, is vital to a plantation's success.

lower soils have dried and warmed so that roots can grow deeper. During summer rains, surface soils will cool as they recharge with water faster while deeper soils remain drier. Roots will be growing deeper but still accessing much of their water from the upper profiles. During the fall, soils cool from the top down as rainfall recharges the whole matrix.

The litter layer—the uppermost layer of the forest floor usually 1 to 2 cm thick—is composed of needles, leaves and twigs, and is dark brown in colour. This highly porous layer provides a temperature buffer and a vapour seal to maintain bio-

logical conditions for the lower soils. It is also the first portion of soil to warm in the spring, and is colonized by roots of competing vegetation and fungal mycorrhizae soon after snow melt.

Removal of this layer reduces the beneficial effects that can be derived from the lower layers.

The fermenting layer is next, varying in depth to 12 cm. It consists of decomposing organic materials and is reddish brown in colour. This is the layer where most mycorrhizal activity occurs and where the nutrients are released for plant pickup. This material has large pore spaces for rapid free water drainage and also contains large organic particles that hold available moisture and provide the water reservoir for the plants through

drought periods. It is in this layer that some 90% of active root tips occur on plants. Fermenting layers are thickest on high spots, surrounding stumps and along large fallen logs.

The humic layer, the third layer down, varies in depth according to site wetness and consists of composted organic materials, black in colour. In natural profiles, this layer is non-porous, wet and slick to the touch. It is generally cold, less than 8°C, as long as it is wet, and is essentially non-biological. Where fire has removed the upper two layers, this layer is like clay and will crack in the heat of summer.

The mineral complex is biological to the extent that oxygen, temperature, nutrient and moisture conditions are suitable. Mineral soils in Canada tend to be compressed and anaerobic, and have poor oxygen/ moisture relationships with

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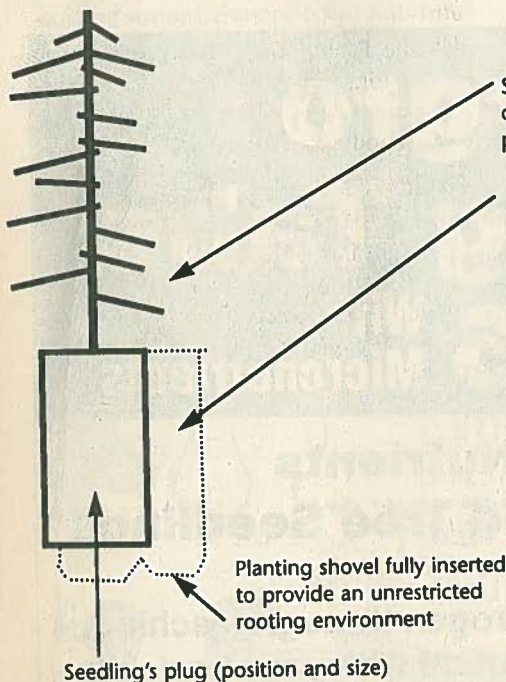


Figure 2.- Seasonal temperatures affect location of root growth in soil levels

	DEPTH	AIR OR SOIL TEMPERATURES IN DEGREES CELSIUS				
		Snow melt + 2 weeks	June top growth	Summer hot day	Summer rainy day	Fall cool day
Air		22	20	28	14	8
Litter	- 2 cm	23 **	22 **	26 **	12 *	8
	- 5 cm	15 **	18 **	20 **	15 **	12 *
Fermenting	- 10 cm	8	10 *	15 **	15 **	14 *
Humic						
Mineral Complex	- 15 cm	5	8	12 *	12 *	12 *

** Optimum Root Growth Range

* Low Root Growth Range

Figure 2 shows an effectively planted seedling in average forest soil, showing soil temperature gradients that are expected through the growing year. The asterisks in the soil temperature table show how the root growth zone moves down through the soil strata, starting at the top of the plug in early spring and reaching the lower depths by fall. It is important that the plug be placed with root tips in all strata and particularly at the Litter / Fermenting Interface. Root tips will be quiescent in adverse periods and grow opportunistically in suitable periods. Having root tips in the Litter / Fermenting interface is critical to the seedling's ability to replenish itself with nutrients after the debilitating winter period and before the demanding top growth phase.

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plants through much of the year. Generally, when these are covered by organic soils, they provide foundation only and offer minimal root-growth opportunities for establishing seedlings.

Plant stability

Selecting a planting site that will maintain good light levels, and ensure little damage or stress, is vital to a plantation's success. Vegetation competition, animal damage, frost heaving, and snow shear are some of the factors that can damage or kill establishing seedlings. Planting seedlings in protected areas offering good light and near large obstacles have proven to be important to seedling stability. Generally, there is a different vegetation community in high places. The overhead canopy opens earlier in the fall, and is less compressive under snow than communities in lower places.

Frost heaving of newly establishing seedlings is a persistent problem in fine

textured mineral or humic soils. Frost heaving is widely misunderstood. Most people believe that the ground somehow freezes like a vice around the seedling's lower roots, and this action throws the seedling out of the ground.

In fact, frost heaving occurs in the presence of exposed fine textured mineral soil and a surface depression. Water lies on the surface and is frozen at night, expanding in a plate of ice that locks onto the seedling. Soil capillary water, rising to the freezing surface, expands as hoar frost and lifts the frozen plate as much as 5 cm above the soil surface. During subsequent days and nights, melting and re-heaving occur. Eventually, the seedling is left lying flat on the ground.

Bare root nurseries prevent frost heaving by spreading 1 to 2 cm of sawdust over the soil beds. This does not prevent surface freezing but it does break the capil-

laries, thereby preventing the seedlings from being separated from the soil. Frost heaving in plantations can be prevented by gathering a 2 cm layer of porous organic material around each seedling to break the capillary water connection.

Crop tree spot location

Highest spot planting is proving to be increasingly important to effective plantation establishment. Growing large tall trees is not a matter of good luck. Analysis of hundreds of forest sites has revealed that in most instances the largest stumps are to be found on the highest spots.

High sites have a lot to offer new seedlings. Loose organic soils are deepest on high spots and along decaying rotting logs. Soil temperatures are higher in these looser, better drained soils, particularly in the critical early spring/ pre-bud break period. In addition, soil oxygen is greatest in larger pore spaces, and oxy-



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gen/moisture relationships are more effective in the presence of large organic particles.

In high-site locations, especially near large obstacles, good light is more readily available since there is little or no vegetation above them, and the vegetation cover degrades earlier in the late summer. Plant integrity is generally better since the obstacles (stumps) can provide protection against environmental or animal damage. In addition, the heat radiating from the old stumps keep the plants warmer in the critical evening periods when sugar metabolism can be completed and allocated effectively.

Good behaviour in planting

Always remember the most important ten seconds in a tree's life is the time taken by the planter to select a spot and place it correctly in the rooting media.

Identify the "point of germination" of existing stumps. Stumps occur naturally

on high places, as low places are saturated with cold, stationary water through most of the year. Effective crop tree spots will be as near as possible to the elevation of the existing large stumps.

Try to achieve a similar elevation to the original stumps. This may require some alteration of the normal planting grid so as to concentrate trees in higher places while extending distances between trees in lower places, where no stumps occur anyway.

Place the planting hole about 10 to 15 cm from existing stumps or obstacles. Compressing the root against any buried obstacles, old stems, roots, wood or rocks may greatly inhibit or even kill the seedlings.

Insert the planting shovel fully with one hand. In spots where you can't push the shovel in with one hand, root growth will be inhibited. Shovels can be inserted most easily in looser, mixed organic/

mineral soils. No obstacles are to be in the bottom of the hole, which could restrict the root's access to deeper soils as desired.

Create a narrow, vertical hole 1.5 x the plug length. Extra depth is important below the plug to allow the roots free growing and unrestricted access to deeper soil strata if desired.

Position the plug at the side of the hole with the top of the plug level with the top of the undisturbed forest floor litter. This will ensure contact with as much warm, aerated soil as possible, and allow the root tips to be positioned to grow where the opportunities occur throughout the growing year. Place the plug vertically, with no J's and with no obstructions or compressions in the hole.

Close the top 10 cm of soil gently around the roots to create an effective vapour

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PLANTING SPOT SELECTION

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seal and use the three needle test to check firmness. Again, compression of the roots will inhibit root growth. Our objective here is to create a vapour seal that will maintain an optimum humidity, oxygen and temperature environment for root growth.

Conclusion

As the amount of land available for forestry becomes smaller and smaller, more must be done with less. In this light, successful early establishment of freely growing plantations has increasingly important benefits, both in immediate financial and in future timber flow aspects.

By setting aggressive standards for our specific plantations, the levels of growth noted in our criterion of excellence are

attainable. Furthermore, no great expense is required. Meeting this criteria requires that we pay close attention to plant growth cycles, seedling physiology, and crop tree spots. With these actions, we get seedlings off to the best start possible, and accomplish the important step of getting root growth before top growth.

It's important to note that previous crop trees grew naturally on the highest spots in our forests. We must understand why those spots were so effective, and give new seedlings the same advantages. By carefully following these key steps, 80% of the trees in any new plantation site can grow to become highly valued crop trees. ▲

David Lloyd is with Pelton Reforestation Limited, and **Ron Elder**, is with R.J.E. Elder Forestry Consulting.

Résumé

La recherche démontre que les semis établis dans les zones d'arbres du peuplement final aura le meilleur occasion de produire un forêt commercial en le moins temps possible. En mettant en place des normes rigoureuses pour les plantations spécifiques, les niveaux de croissance dictés par nos critères d'excellence seront possibles. Pour obtenir ces critères, il va falloir faire attention aux cycles de croissance naturels, à la physiologie des semis, et à la station d'arbre du peuplement final. Les arbres du peuplement final régénèrent naturellement aux zones les plus élevées du forêt. Pour informer notre plan parcellaire de régénération on devra savoir pourquoi ces zones sont les plus convenables pour la régénération. En suivant ces mesures, 80% des arbres plantés pourront prendre de la valeur comme arbres du peuplement final.

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Making informed decisions when planning long-term harvest levels

D.R. Reimer

The BC forest industry is facing significant challenges. Based upon recent reviews by the provincial Ministry of Forests, cuts are predicted to be in decline. The decline results from a variety of issues, including reductions to the commercial forest landbase and changes in forest management practices as a result of the new Forest Practices Code.

As wood supply planners are well aware, small changes in beginning assumptions can have relatively large effects on long-term woodflows.

Discussions on "impending" reductions in the provincial AAC have been ongoing for a number of years. In general, these discussions have focused on two general topics: the assumptions and processes used in determining the available commercial forest landbase; and the assumptions used in forecasting future forest growth and the impacts of intensive forest-management practices. The general consensus has been that harvest levels are expected to gradually decline between 15 and 20% over the next few decades, and then stabilize or gradually increase slightly as age-class distributions improve and second-growth forests mature.

As wood supply planners are well aware, small changes in beginning assumptions can have relatively large effects on long-term woodflows. As an illustration of the sensitivity of long-term woodflows to assumptions, this article presents one example of the impact of a relatively simple change in assumptions on the inclusion or exclusion of low productivity forested lands in the contributing landbase.

As part of the determination of the available productive, commercial forest landbase for a Timber Supply Area (TSA), a process of "netting down" the landbase is used to determine what lands within a TSA could reasonably be expected to be available for timber harvesting. Typically, the "netdown" (or landbase reduction) process involves a series of reductions. Usually, these include reductions

for non-forested areas (e.g., alpine, rocks, water bodies), non-commercial cover (e.g., non-commercial tree species or brush), lands not provincially owned, lands set aside for parks or recreation areas, environ-

mentally sensitive areas, existing roads and trails, and non-merchantable forest types. After these categories have been removed, what is left is deemed to represent the net contributing commercial forest landbase. Typically, the net contributing landbase represents between 60% and 75% of the original productive commercial forest landbase.

For purposes of illustration, an artificial, representative, central-interior TSA landbase was constructed. The landbase consists of 1-million hectares, of which 800,000 hectares are classed as productive forest land. After netdowns, using typical MOF procedures, approximately 600,000 hectares are left as the net contributing landbase for timber harvesting. Based upon a cross-section of typical TSA netdowns, assume the main netdown categories were as follows:

• non-commercial cover	3,500 ha.
• environmentally sensitive areas	45,000ha.
• deciduous forest types	35,000 ha.
• low productivity sites	60,000 ha.
	(site index < 10m @ 50 yrs bhage)

• low volume (non-merch) stands	13,000 ha. (mature merch volume < 140 m ³ /ha, SI ≥ 10m)
• existing roads and trails	13,000 ha.
• future roads and trails allowance	20,000 ha.
• current NSR*	20,000 ha.

Total deductions	209,500 ha
------------------	------------

*current NSR was included in the landbase as it was restocked

Three sets of scenarios were simulated using these data. The simulations were run using a proprietary forest-estate planning model, OPTIONS, which is a deterministic, spatially-explicit, simulation-based planning tool. OPTIONS grows and manages each forest cover polygon (or each forest management treatment unit), using user-defined decision rules, user-specified silvicultural treatments, and assigned yield tables.

The first scenario is based upon Ministry of Forests' standard TSR landbase assumptions, yields and silvicultural treatment definitions. The second scenario adds Basic Forestry silvicultural practices (regen, spacing and pine fertilization), adds 10% to the yield tables for basic silvicultural treatment impacts, and includes deciduous types and low-site stands. This second scenario is meant to represent a feasible scenario that has a high likelihood of implementation in actual practice. Basic Forestry silvicultural practices are standard throughout BC. In many instances, deciduous and low-site/low-volume stands are being harvested when log markets are high or logs are in short supply. Scenario three is the same as scenario two with the trial harvest level raised to 1.75 MM m³.

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Figures 1 and 2 depict the results of simulating this landbase using typical rotation ages as used in the Timber Supply Review (TSR) studies, MOF yield tables, and conservative forest silvicultural

In many instances, deciduous and low-site/low-volume stands are being harvested when log markets are high or logs are in short supply.

practices (reforestation only). As can be seen, the landbase under these assumptions cannot sustain a fixed harvest level of 1.5 MM m³. This is consistent with MOF results.

Figures 3 and 4 depict the available harvestable timber volumes and the sources of timber harvest using all of the same harvesting assumptions as were used in Figures 1 and 2—but with deciduous forest types, low productivity sites and low-volume stands included in the con-

tributing landbase, and assuming basic silvicultural practices are in force. Basic silvicultural practices refer to the level of forest management, commonly referred to as "Basic Forestry" in BC. Under Basic Forestry assumptions, interior silvicultural practices include

prompt reforestation, spacing of overstocked juvenile stands, and fertilization of medium and good site pine stands. (On the BC coast, Basic Forestry assumptions include prompt reforestation, spacing of overstocked juvenile stands, and fertilization of medium and good site Douglas-fir and some western hemlock stands.) Basic Forestry practices, as used in this illustration, do not include commercial thinning treatments. A long-term harvest level of 1.5 MM m³ appears sustainable.

As can be seen in Figure 4, the available standing volume of mature timber is quite stable over the last 100 years of the simulation, implying that this is a poten-

tially sustainable scenario. Figures 5 and 6 depict the results of keeping all silvicultural assumptions the same as in Figures 3 and 4, but raising the target harvest level to 1.75 MM m³. Based upon inspection of Figure 6, it would appear that it will be difficult to meet biodiversity requirements, even though the simulation did show (Figure 5) that 1.75 MM m³ could actually be harvested over the planning horizon included in the simulation.

Conclusion

These results indicate that allowing inclusion of presently excluded low-site and low-volume non-merchantable types has significant potential. Whether or not inclusion of all such lands is appropriate is dependent upon the particular situation in each TSA. The point is, however, that such lands commonly do form a significant portion of the productive forest landbase and, as such, any changes in their status has significant impacts on long-term harvest levels. The fact that harvest levels can be significantly affected by simple assumptions deal-

Figure 1- Source of Annual Timber Harvest, Volumes Cut, Scenario 1

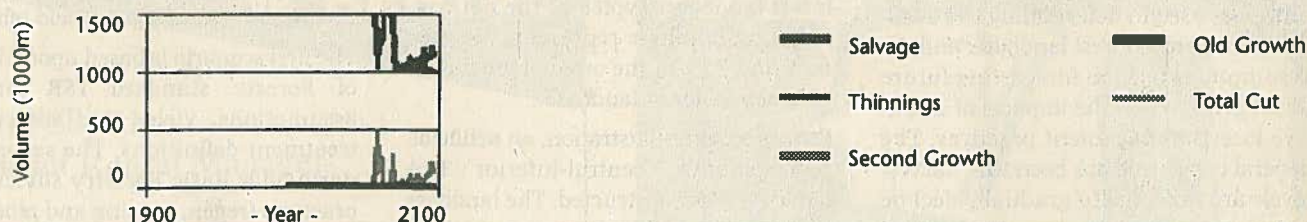


Figure 2- Source of Annual Harvest, Volumes Available, Scenario 1

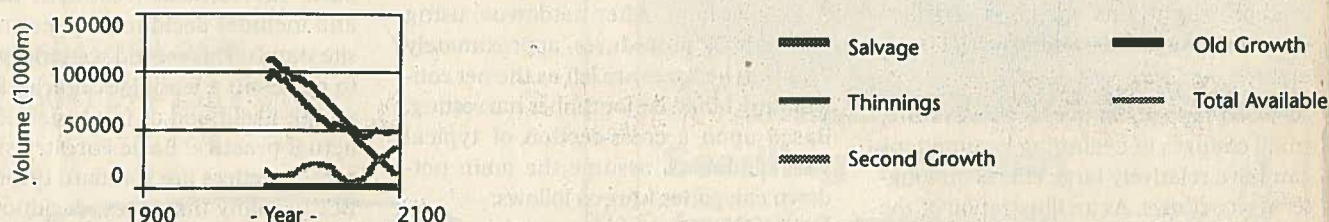


Figure 3- Source of Annual Timber Harvest, Volumes Cut, Scenario 2



ing with these types of forest lands, implies that future timber-supply review studies must pay more attention to how these lands are treated. Similarly, operators who are dependent upon stable, long-term wood supplies should pay close attention to assumptions such as disposition of low site lands.

Estimated long-term harvest levels are very sensitive to beginning assumptions.

Many of these assumptions must be based by necessity upon informed opinions versus hard facts. As this simple illustration shows, simulated trends in long-term sustainable harvest levels are easily influenced by relatively minor changes in assumptions. ▲

Résumé

La recherche indique que l'inclusion des stations non-marchand qui sont présen-

tement exclure est prometteuse. L'inclusion des peuplements non-marchands doit considérer les conditions du site et du zone d'approvisionnement de bois (TSA). Les peuplements non-marchands constitue une bonne portion des forêts productifs. Alors, un changement dans la politique forestière pourra vraiment affecter les niveaux de coupage long-termes.

Figure 4- Source of Annual Timber Harvest, Volumes Available, Scenario 2

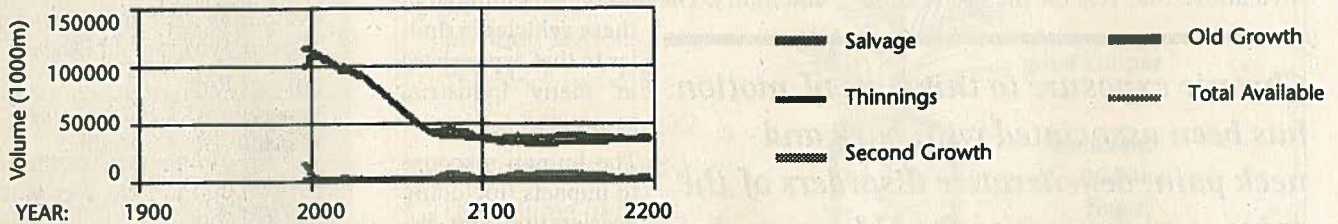


Figure 5- Source of Annual Timber Harvest, Volumes Cut, Scenario 3

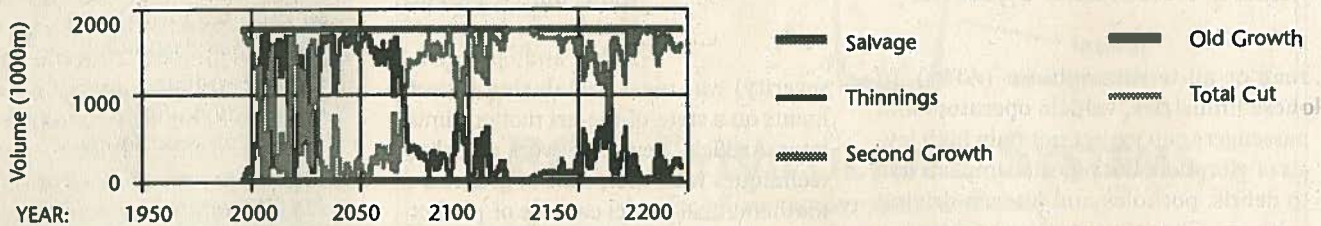
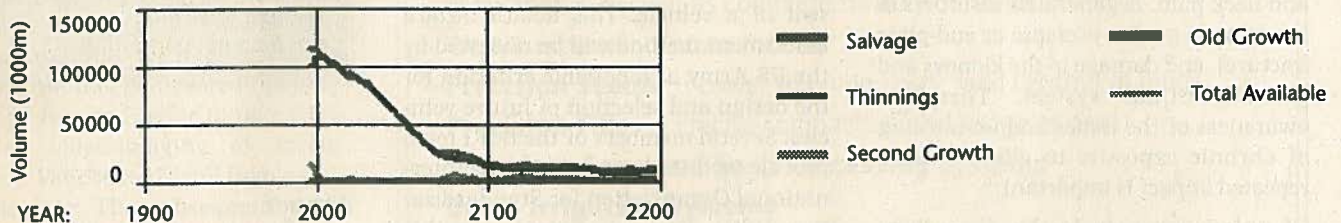


Figure 6- Source of Annual Timber Harvest, Volumes Available, Scenario 3



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ATV hazards studied

Dan Robinson

Millions of workers worldwide are exposed to potentially harmful vibration and mechanical shock while operating the equipment of their trade. This is of particular concern in industries such as forestry, mining and silviculture that rely on the use of off-

includes repeated impacts typical of off-road vehicle operation. BCRI was contracted by the US Army to characterize the motion environment of off-road military vehicles, and the relationship between exposure to repeated impact and injury. The motion encountered in

these vehicles is similar to that experienced in many industrial scenarios.

The human response to impacts (including acceleration and displacement of the spine, muscle fatigue, blood and urine chemistry, and perceived

severity) was measured during experiments on a state-of-the-art motion simulator. Artificial neural network modeling techniques were then used to generate a mathematical model capable of predicting the probability of chronic spinal injury from measured acceleration at the seat of a vehicle. This health hazard assessment method will be reviewed by the US Army as a possible criterion for the design and selection of future vehicles. Several members of the BCRI team provide technical expertise to the International Organization for Standardization (ISO), who are considering this method as part of a new international standard for occupational exposure to repeated impact.

The probability of injury and ride comfort can be greatly influenced by proper maintenance of road surfaces and vehicles, control of vehicle speed, driving strategies (obstacle avoidance), and limits to the duration of severe motion exposure. ▲

Dan Robinson is with the Ergonomics and Human Factors Group at BCRI.

Chronic exposure to this type of motion has been associated with back and neck pain, degenerative disorders of the spine, and damage to the kidneys and gastro-intestinal system.

road or all-terrain vehicles (ATVs). In these industries, vehicle operators and passengers can expect not only high levels of vibration, but repeated impacts due to debris, potholes and uneven driving surfaces. Chronic exposure to this type of motion has been associated with back and neck pain, degenerative disorders of the spine (e.g., disc prolapse or end-plate fracture), and damage to the kidneys and gastro-intestinal system. Therefore, awareness of the issues and monitoring of chronic exposure to vibration and repeated impact is important.

Of unique concern to the silviculture industry is the potential for very large and frequent impacts while crossing "water bars". Internationally accepted standards and guidelines exist for evaluating the health hazard posed by occupational exposure to vibration (e.g., ISO 2631). However, these standards are not applicable when large or frequent impacts are encountered.

The Ergonomics and Human Factors Group at BC Research Incorporated (BCRI) is developing a new method to assess the health hazard associated with exposure to whole body vibration that

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René Ouellette,
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Francis Donnelly,
*Northwest Forest Nursery
Owners Association*

Jim Verboom,
*Nova Scotia Silviculture
Contractors Association*

Grant Brodeur,
*Ontario Silviculture
Contractors Association*

Marcel Arsenault,
*PEI Silviculture
Contractors Association*

Dirk Brinkman,
*Western Silviculture
Contractors Association*

Résumé

Plusieurs des ouvriers qui font marcher les véhicules tout-terrains sont exposés à la vibration et au choc mécanique. Les effets d'exposition chronique comprennent la douleur de dos et cou, les maladies dégénératives du colonne vertébrale, et blessures aux reins et à la système gastro-intestinale. Pour empêcher ces dangers, il faut maintenir les surfaces des routes, garder les véhicules en bonne condition, contrôler la vitesse, améliorer les stratégies de conduite, et limiter l'exposition aux mouvements sévères.

The trend towards auditing

Dirk Brinkman

Speeding to get to the premiere of the film *Forests Forever* on time, I was suddenly surrounded by a brief flash of light—photo radar. As my foot did not lighten on the accelerator, I realized that for me photo radar was just a speed tax. By contrast, when I am stopped by a police officer, I usually drive away slowly.

Will the Canada-wide shift in the forest sector from process-managed regulations to audits be like the shift from being stopped for speeding to being photo-radarred? Process-oriented regulation management is more like having backseat police officers constantly filling out forms, authorizing every move the driver may make. The resulting slow-downs have been expensive for the forest sector. A shift towards auditing, especially in the face of serious losses throughout the industry, is a welcome relief.

In February, forest photo-radar cameras were not exclusively in the hands of government auditors: BC's Sierra Legal Defense Fund had contracted the filmmakers of *Forests Forever* to take GPS-calibrated video-imaging of recent logging on Vancouver Island from a roving helicopter. The subsequent news footage and investigation by the Forest Practices Board is putting the code to the test. Will the Clark government be sympathetic, and not fine an industry in the middle of a forest products recession but discipline MOP offices instead?

The Harris government is also downloading OMNR backseat processes to industry drivers. Some of these processes include layout, silviculture prescriptions, tree marking for selection cutting, GIS, and even fire protection, leaving OMNR with audit responsibilities only.

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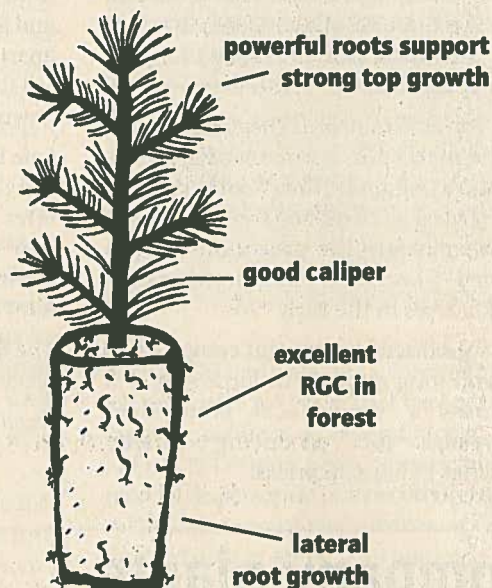
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Greenhouse follies

The Nova Scotia government sold a multi-million dollar greenhouse complex for \$15,000. The two greenhouses at Middle Musquodoboit were part of a \$7-million forest nursery and education complex opened by the Tory government in 1989.

The Tories established the complex just as the market for spruce seedlings was about to collapse. Nova Scotia production peaked at 26 million trees in 1988—the year before the greenhouses were opened—and then plummeted to nine million trees in the early '90s.

The subsidized government complex was around long enough to force out of a business a small local greenhouse renowned for producing quality seedlings at bargain prices.

Transportation and Public Works had the greenhouses declared "surplus". The seedling operation was shut down by the time the Liberals took power in 1993, and the greenhouses were starting to fall apart. The government figured it should sell the greenhouses soon before they fell down entirely.

Late in 1995, Jim Keizer's Dew Drop Gardens became the only firm to make an offer (\$3,025) on the greenhouses. A new deal was struck with Keizer this summer for \$15,000 and 90 days to haul the greenhouses off the site.

The forestry education complex is still in place and frequented by students.

Reported in The Chronicle Herald.

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Company plants 100 millionth seedling

In a ceremony at Second Falls, New Brunswick, Fraser Papers Nursery planted the 100 millionth tree produced under its reforestation program. Since 1978, Fraser Papers has planted 58.6 million seedlings on 30,000 hectares of freehold land, and 41.4 million seedlings on 24,500 hectares of Crown land.

"This 100 millionth seedling represents our ongoing commitment to our forests

that will ensure the fibre needed to support our pulp and paper mills, as well as our lumber operation," explained Don Tardie, wood products general manager. "In managing for a sustainable forest, Fraser will continue to serve other uses such as wildlife, fisheries and recreation."

Fraser Papers is owned by Noranda Forest Incorporated.

Reported in Forestry Today.

Résumé

Le gouvernement du Nouvelle Ecosse a vendu un complexe de serres estimé à plusieurs millions de dollars pour \$15,000.

En Nouveau-Brunswick, le programme de reboisement de la pépinière Fraser Papers vient de plantée son centième million de semis.



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La formation intégrée en entreprise, est-ce possible pour l'éclaircie précommerciale?

Tony Côté

La gestion des contrats d'éclaircie précommerciale est difficile à faire. Pour des compagnies possédant plusieurs contrats distribués sur un grand territoire la qualité du personnel est primordiale. L'entreprise doit posséder un taux de roulement des travailleurs très bas pour pouvoir demeurer compétitive. L'instabilité des débroussailliers préoccupe les planificateurs avant et pendant la saison estivale. Pour obtenir, mais aussi, pour maintenir le rendement escompté, un nombre stable de débroussailliers ainsi qu'une bonne productivité sont des éléments importants.

D'année en année, sur chaque contrat, un petit noyau de débroussailliers revient, mais durant la saison, il faut constamment renouveler un grand nombre de travailleurs instables et improductifs. Comment enrayer ce taux de roulement énorme?

Une formation dispensée pendant la période hivernale dans une salle de cours, suivi d'une petite période pratique au début mai est définitivement un échec total. Du nombre qui ont suivi ce type de cours, seulement deux à cinq pour cent (2 à 5%) réussissent. Ce type de cours ne garantit définitivement pas la productivité et la fidélité du personnel.

La formation est pourtant essentielle

pour valoriser ce travail difficile.

Une formation intégrée en milieu de travail semble présenter une alternative très valable. Les compagnies devront se créer des centres de formation afin de diminuer de façon considérable le roulement de personnel.

Le centre de formation

Le centre de formation devra être créé à l'intérieur même d'un contrat d'éclaircie précommerciale. Un instructeur formera les gens qui lui seront envoyés. Tous les nouveaux travailleurs de l'entreprise, qu'ils soient expérimentés ou non, devront se rapporter à l'instructeur pour être formés et évalués.

Sur ce site permanent, l'activité de formation se déroulera tout l'été. Le tout pourra s'alterner entre des périodes théoriques et pratiques au besoin. Sur le terrain les étudiants travailleurs seront suivis de très près. Pendant ces exercices les gens seront rémunérés à partir d'un taux horaire. Ceci leur permettra d'apprendre sans se soucier de leur salaire.

La période de formation peut varier d'une personne à l'autre. Tous les gens devront faire un test après une certaine période. L'instructeur pourra alors évaluer le niveau de compétence de l'étudiant. Si la qualité du travail est satisfaisante alors l'étudiant est dirigé

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René Ouellette, *President*

sur un des contrats de la compagnie et est rémunéré à forfait. Tout ceci permettra au travailleur de se familiariser avec la forêt et l'éclaircie précommerciale. De plus, cette personne pourra atteindre des revenus qui seront respectables en temps de formation et après la formation.

Pour l'entreprise, le centre de formation sera un endroit de sélection. Il sera un moyen de trouver des gens compétents, ayant de bonnes habiletés à l'éclaircie précommerciale. La gestion sera plus efficace, car sur les secteurs d'intervention, les débroussailliers seront beaucoup plus productifs. Les superviseurs de contrat pourront alors se préoccuper de leur vrai travail, l'éclaircie précommerciale...

Tony Côté est avec Reboitech.

CONTINUER LA PROCHAINE PAGE

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A DIFFERENT LINE OF PLANTING TOOLS

QUEBEC REPORT

CONTINUER DE LA PAGE PRÉCÉDENTE

Summary

Management of pre-commercial thinning contracts requires a stable number of brush workers in addition to a high level of productivity. In the past, pre-commercial thinning contracts have experienced high turnover rates of brush workers from year to year. A proposed solution to this problem would be to create a mandatory training program for all new employees. This training would provide a unique opportunity for interested individuals to gain the skills required to work in pre-commercial thinning, as well as providing a way for companies to integrate management through recruitment of skilled workers. ▲

NATIONAL REPORTS

"AUDITING" CONTINUED FROM PAGE 25

Licensees cutting less than 200,000 cubic metres per year cannot afford the infrastructure this requires. As a result, the bigger companies are absorbing the small entrepreneurs of Northern Ontario in a time-honoured conservative tradition in Ontario politics that reserves power over field workers for Toronto players. In a more dramatic move, OMNR is contracting-out firefighting in 1997 and, by 1998, transferring the responsibility for initial attack and suppression crews to forest companies.

Environmental regulations and their liability are becoming increasingly complex and interdependent. It is reasonable to give those who have to pay for these regulations, the flexibility to comply with them in the most economic way possible. In this way, sustainable harvesting becomes affordable. However, players in forest management are not the only ones who are watching the trend towards auditing carefully—so are environmentalists, certification auditors, and consumers in green countries. ▲

Résumé

Le changement national dans le secteur forestier qui remplace les réglementations aménagées avec la vérification des comptes est bienvenue, parce-que les réglementations sont coûteuses et prennent beaucoup de temps. Les joueurs d'aménagement forestier ne sont pas les seules qui s'intéressent au changement—les écologistes, vérificateurs des certificats, et consommateurs des pays verts s'intéressent aussi.

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Nursery closures spark new alliance

Concerned over the closure of several provincially run nurseries, the Ontario Forestry Association published a call to action recently asking associations and individuals to join them in sending a message that "the availability of bare root nursery stock for private lands is a responsibility of the government that cannot be ignored." Ontario has been in the "reforestation business" since the turn of the century. Indeed, the St. Williams Forest Station was estab-

foundering ecosystems are given much needed assistance, and conservation and education benefits are being realized.

All of this is about to cease. For the past several years, there has been a steady reduction in the number of provincial tree nurseries producing bare root stock for private land. The first nurseries to close were Thunder Bay and Midhurst, and then more recently, Thessalon, Orono, and Kemptville in 1996. These nurseries are no longer operating and, in

many cases, stock has been left in the fields. The nurseries will likely be sold to the highest bidder—they will never re-open.

The last three nurseries in the provincial system are St. Williams, Swastika, and Dryden. While the intent of the government is to divest itself of these remaining nurseries, it is unclear

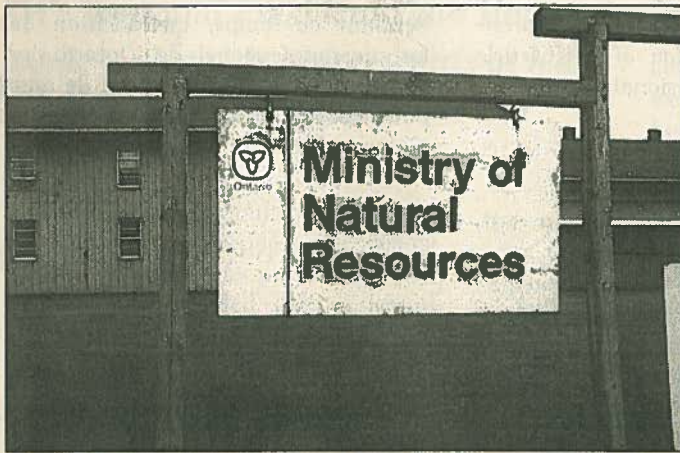
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as to whether there is any intent to have them taken over by the private sector as tree nurseries.

The position of the OFA and the new Private Land Reforestation Alliance is that "the Ontario government must ensure the continued availability of bare root stock for reforestation/afforestation purposes on private land." The alliance believes the provincial government has an obligation in this area that "cannot be privatized." Failing to honour this commitment will put the government in the position of abandoning its constitutional obligation of responsibility for the management of Ontario's natural resources.

Reported in The Forestry Chronicle.



Concerns about OMNR de-regulation and downsizing have led to the formation of a new OFA-led alliance and to a referendum on licensing at OPFA.

lished in 1908 and continues to produce nursery stock today. At the height of bare root reforestation activity, eight provincial forest tree nurseries were active, with just over 250 million trees per year being produced for both public and private land.

In southern Ontario, the demand for bare root planting stock for reforestation or afforestation purposes has been constant. Stock has been used for soil stabilization, windbreaks, planting of abandoned fields, Christmas trees, nut trees, erosion control, wildlife and bird habitat, recreation, education and countless other objectives. Overall, marginal lands are being reforested, ground cover is established and stabilized,

Will forestry be licensed in Ontario?

George Bruemmer

Within the Ontario Professional Foresters Association (OPFA), the topic of licensing has been under consideration for far too long.

Following the conclusion of the Timber EA, it appeared that forest management was moving into a time of high regulation. Forestry practices were being regulated in so many different ways that the question arose as to whether licensing was relevant any longer in terms of protecting the public interest.

Now, however, the current government is downsizing, privatizing, and de-regulating. Suddenly, licensing would appear to be a necessary and justifiable mechanism to ensure the public interest is served with respect to the regulation of forestry practices. And as a non-governmental form of regulation, it is a mechanism that would have a certain appeal in this new regulatory climate.

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Licensing has been dealt with by the OPFA and its members a number of times in the past. On those occasions, the will to see it happen was not present in the minister of the day.

Rightly or wrongly, licensing has become the symbol within the OPFA of all that is good and all that is not. Many members of the association, including myself, do not fully understand all the implications and ramifications of licensing. What should be clear, however, is that a decision is required on this issue. To that end, we have set a deadline of March 31, 1997, for a referendum style vote to settle the question of whether or not we should pursue licensing. (At press time, the referendum result was unknown.)

The topic of licensing generates strong opinions on all sides. Some members have indicated they would resign from the OPFA if licensing were not pursued.

Rightly or wrongly, licensing has become the symbol within the OPFA of all that is good and all that is not.

Others have indicated they would if it were.

More importantly, this is not a question of what foresters want. It is a question of what is right, good and appropriate for the people of Ontario, for the profession of forestry and, ultimately, for the forest of Ontario.

George Bruemmer, RPE, is OPFA president. A longer version of this article appeared in *The Professional Forester*.

Résumé

L'association forestière de l'Ontario et la nouvelle alliance pour reboisement des terres privées opposent la fermeture de plusieurs pépinières provinciales.

Les deux groupes ont récemment publiés un appel qui demande aux associations et aux individus de leur joindre pour exiger que la disponibilité des semis à racines nues des pépinières pour forêts privées est la responsabilité constitutionnelle et historique du gouvernement qui doit être respectée.

Pendant ce temps, l'association des forestiers professionnels de l'Ontario s'organise un référendum au fin de mars pour décider si les membres devront poursuivre des patentes. ▲

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Conference infuses contractors with determination

Roy Biv

"Stirred not shaken" might be the best way to describe the more than 100 contractors, who attended the Western Silvicultural Contractors' Association 16th Annual Conference in Victoria last February. Following on President Peter Gommerud's opening remarks calling for a search for creative

end of the conference." And according to Gommerud, "We succeeded in keeping everyone's attention. It was a professional and polished conference. The speakers exceeded our expectations. They were informative and entertaining. At the same time, I think the conference made a good impression on many of the policy makers we wanted to reach in Victoria."

IWA National President Dave Haggard made it clear his union wants at least 50% of the FRBC-funded work in the province.

solutions to the silviculture industry's problems, the conference—attended by a WSCA record-breaking number of participants—proceeded with a list of speakers and panelists that covered a gamut of issues from Forest Renewal BC to the IWA. The two-day event left contractors with a lot to think about, and the WSCA infused with determination to make sure the silviculture industry becomes a player in developing future forest policy.

"We worried we might have overdone it with too much information," said conference coordinator John Betts, who promised members of the audience "they would be seeing things differently by the

Forest Renewal BC Chair Roger Stanyer told the audience major changes were being considered in how the corporation delivers its programs. At the same time, he said that nothing has been decided yet on how the Forest Worker Employment Agency would place workers on FRBC-funded projects. Stanyer asked contractors to help "champion Forest Renewal," pointing out that many groups were "pushing" their agendas and, in some cases, pushing away from Forest Renewal BC.

IWA National President Dave Haggard made it clear his union wants at least 50% of the FRBC-funded work in the province. He also told contractors he was prepared to discuss how the contractors could work with the IWA to share in the FRBC-funded work. However, Haggard

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Karline Mark-Eng,
Administrative Secretary

kept his comments in the broadest terms admitting, when questioned on specific issues like seniority and a separate local for silviculture workers, that he wasn't certain about the details. However, IWA Canada Local 1-71 President Darrel Wong, speaking at a panel discussion later, made it clear his local was not prepared to accept piece work as part of a deal with contractors.

Graham Lea, Secretary-Treasurer of the Truck Loggers Association, gave some insights into how governing works and how the TLA has organized itself. Lea also described Bill 13, an amendment to the Forest Act that affects the relationship between logging contractors and their clients. In effect, the bill gives truck

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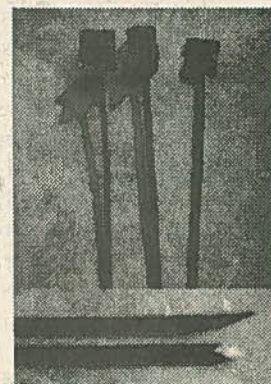
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loggers a form of tenure in their contracting relationships. Lea indicated the bill had some themes that silviculture contractors could consider applying to their industry. He said that silviculture contractors could possibly be written into the agreement. Lea also invited the WSCA to next year's Truck Loggers Association conference, and offered his assistance to silviculture contractors.

Don Cochrane, Forest Jobs Commissioner, explained his mandate and gave contractors a general outline for framing a strategic approach to their industry's issues. He also outlined the preliminary results of his office's study of the silviculture workforce on the West Coast. Cochrane said his early figures indicated a silviculture workforce of at least 3,000 workers. This figure is based on the first wave of responses from over three hundred contractors believed to be active on the West Coast. Cochrane also described the \$27,000-per-forest-worker transition package, available to displaced forest workers through the Forest Worker Employment Agency.

Ross Streyvoke of Forest Industrial Relations gave his seasoned views on the world of forest labour relations in BC, advising contractors to get qualified assistance before they enter into any kind of negotiations with unions in the province.

Political insider Brad Zubyk amused the dinner crowd with his take on politicians and the process of government, which most of us recognize but don't understand. He gave some very specific advice on what not to say to politicians and how to get the results you want when working with government. Corky Evans, Minister of Agriculture, Fisheries and Food, added his personal views on government following Zubyk's speech.

Bill Horswill and Shane Wardrobe gave a presentation pointing out that Forest Renewal BC funding to First Nations forest programs may be exaggerated. Dan Loussier gave a rundown on the sheep-grazing sector's strategy for dealing with its downturn in standtending work over the last few years.

Six panelists took part in a morning session that covered perspectives from industry, the IWA, the Jobs Protection

Commission, MOF's Forest Practices Branch, FRBC, and silviculture workers. Michael Mloszewski, of the recently formed Pacific Silviculture Workers Association, stressed that silviculture workers had to be considered in the ongoing policy discussions regarding the government's Jobs and Timber Accord. Bill Dumont, Chief Forester for Western Forest Products, reviewed some of his industry's frustrations and reservations with regard to FRBC, as well as some of the opportunities he saw for contractors in forestry. He also chided the industry for what he saw as a lousy safety record. Likewise, Darrel Wong made it clear how his IWA local felt regarding silviculture contracting, saying in particular that he was opposed to any form of piece work. ▲

Résumé

Le WSCA a tenu leur seizième conférence annuelle à Victoria février passé. Les participants ont parti avec le but d'assurer que l'industrie sylvicole participe avec le développement du politique forestière au Colombie Britannique. Les effets de FRBC sur les entrepreneurs sylvicoles a été beaucoup discuté.

What are the options in structuring FRBC land-based employment?

Joyce Murray

The compact between the forest resource steward (government) and the primary users (licensees) is presently being revisited. Government wants quantifiable increases in forest industry employment, and licensees want quantifiable decreases in government intervention in the form of regulations and taxes. Land-based investments funded by FRBC (primarily enhanced forestry and watershed restoration) are targeted as a primary source of new jobs. Jobs and Timber Accord decisions reached by government and licensees will shape the structure of the employment: what work, who does it, and who employs, trains and manages workers.

This analysis assesses three structure options being considered by FRBC. The WSCA intends to help design an employment structure that considers and balances government and licensees' short- and long-term goals.

Forest workers from harvest and manufacture have seen a decline in employability due to forest policy changes. Labour requested a structure, possibly based on Highway Constructors Limited (HCL), to ensure that displaced forest workers are first in line for FRBC land-based jobs.

BC's some 300 silviculture businesses and approximately 18,000 workers have

delivered basic and enhanced silviculture programs since 1970. These firms have survived and matured through the ebb and flow of silviculture program funding and regulatory changes. The WSCA has been assured that existing silviculture businesses and workers will not be inadvertently displaced by new forestry employment structures emerging from the Jobs and Timber negotiations.

In the analysis that follows, it is a given that land-based jobs for displaced forest workers are a priority. However, the structure determining who employs the workers will govern whether land-based programs can be delivered on the ground quickly, or will suffocate from adminis-

tration and training bottlenecks. The long-term sustainability of these jobs will ultimately determine the structure's success or failure. If "how land-based work is done" reduces the return on investments in the forest land and resource, then the jobs will be expensive and temporary. If the structure facilitates real return on forest resource investment (e.g., through cost-effective AAC lifts), then the jobs will be sustainable. They will outlast temporary job-creation budgets. BC's silviculture history suggests that only a structure that fully incorporates existing silviculture-business expertise will have the capacity to carry out the work effectively now, and sustain these jobs over time.

As with any forest policy issue, there are many stakeholder groups and a complex web of legitimate goals to consider. For simplicity, this analysis selects three primary objectives of the two major players, government and industry. The objectives are government's goal of creating stable forestry jobs; licensees' goal of achieving value for money invested in forestry; and a shared goal of creating a sustainable program that will prove to be a success over time

For each goal, three criteria are used to predict which employment structure will best contribute to its achievement. The constraint of political feasibility is also considered.

Defining and assessing the options

FRBC is considering three distinct options for structuring land-based employment. In Option 1, a new agency is the "employer of record," similar to the HCL. (The HCL formed to employ the labour force for the Island Highway Project, under the terms of a collective agreement. The HCL tenders the work to contracting firms, and delegates the contractor the sole responsibility for the management, operation, direction, supervision and performance of the work.) In Option 2, licensees create in-house crews to do land-based work. Finally, in Option 3, silviculture businesses employ workers on long-term, multi-task projects.

The FRBC Board is exploring a menu

approach incorporating all three options. But when would a particular option be applied and why? One licensee has recently developed a "Memorandum of Agreement" with the IWA adopting an Option 2 structure in part of its operations. Do licensees and the IWA want to undertake valley-by-valley negotiations regarding the structure of these jobs? The WSCA suggests that all stakeholders will benefit from a coherent strategy for structuring FRBC's land-based jobs, based on a clear understanding of the alternatives.

A multiple-goal analysis can provide a basis for considering the above options. Figure 1 ranks each option in terms of the criteria for the primary goals of government and licensees.

According to Figure 1, the third option in which silviculture businesses employ displaced workers on long-term, multi-task projects, best satisfies the main government and industry goals overall. This option has been described in more detail in the WSCA's "Draft Proposal for Implementation of Bill 12 - 1996," sent to the Forest Jobs Commissioner in December.

The second option, where licensees hire in-house crews for land-based work, is the least workable structure for the new jobs. By excluding the existing silviculture business infrastructure and expertise, licensees will have a limited ability to deliver FRBC's land-based programs quickly or a substantial number of new

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Figure 1: Ranking options in terms of criteria for the primary goals of government and licensees. Criteria are weighted equally with three (3) as the highest relative rank, and one (1), the lowest rank.

Goals and Criteria	Opt. 1 Agency	Opt. 2 Licensees	Opt. 3 Business	Key assumptions
Govt Goal: Stable jobs				
• Operates under collective agreement	3	2	1	Agency has coll. agreement; few silvi.-businesses are certified
• Standardizes wages & conditions	3	2	1	Licensee wages and conditions vary
• Creates "jobs not projects"	2	3	1	Agency and silvi. business jobs are project-based
Licensee Goal: Value for \$				
• Lowers cost base	2	1	3	Licensee mngmnt. & admin costs > contractor costs
• Maximizes AAC lift from intensive	2	1	3	Historically, licensee silvi.-crews = lower quality/productivity
• Minimizes bureaucracy	1	2	3	Agency adds infrastructure layer between buyer and supplier
Shared Goal: Sustainability				
• Streamlines FRBC program delivery in the near term	1	2	3	Agency ramp-up delays; Opt. 3. uses business' excess capacity
• Uses existing expert resources	2	1	3	Agency contracts to experienced silviculture firms
• Creates viable jobs in the long term	2	1	3	Licensee jobs most at risk when surplus funding dries up
Constraint				
• Political feasibility	3	1	2	Industry most dislikes Option 2; IWA dislikes Option 3
Total ranking	21	16	23	

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jobs. The jobs created may not be sustainable, since they will be more expensive and less productive than jobs created by silviculture firms specializing in land-based work.

The agency option may merit further discussion to find out whether a structure that reflects the unique character of silviculture and other land-based work can be formulated. It is a compromise approach that should only be considered for geographic areas where Option 3 is politically unfeasible. Otherwise, the extra bureaucracy and cost of an agency "employer of record" will not be justifiable.

The WSCA, in conjunction with the major stakeholders in the forest industry and government, would like the government to announce a jobs program built on consensus about the structure of the new land-based jobs. The association feels this would be possible, and has been asked to help move this issue forward toward a resolution. The purpose of this analysis is to distill some of the conflicting factors that are in the way, to stimulate discussion, and to initiate involvement in creating a land-based jobs strategy that includes WSCA members' interests. ▲

Joyce Murray prepared this report on behalf of the WSCA. Another version of the report was submitted to Don Cochrane, Forest Jobs Commissioner, in late February.

Résumé

FRBC considère trois options pour le gestion des emplois terriens. La troisième option, dont les compagnies sylvicoles engagent les forestiers déplacés pour les emplois long-termes et variés, semble le meilleur choix.



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Championing small jobs

Dirk Brinkman

Jeremy Rifkin, author of *The End Of Work*, advised BC's recent NDP convention that the only strategy for coping with downsizing is to create smaller jobs through a shorter work year or a shorter work week, which allows existing jobs to be shared by more workers. This strategy was adopted by the IWA in their spring labour negotiations.

Roger Stanyer, the chair of Forest Renewal BC to whom Clark is looking to make good his promise of 21,000 new forest jobs, recently pleaded to the WSCA's annual conference, "What we need is a champion." When it comes to creating small jobs, the traditional silviculture industry has been the champion. Few people are aware of just how many jobs already existed in the silviculture industry prior to FRBC, which had concluded that existing silviculture jobs—as "project to project" endeavours—had to be replaced with decent long-term, local jobs.

A 1994 profile of silviculture industry jobs reveals that 17,500 people were employed in small or short-year silviculture jobs. This figure represents a composite of numbers from all activities in the industry. There are two main segments to the industry, with over 17,000 people involved in establishment, and 1500 involved in tending. FRBC's mandate to spend \$400 million a year tend-

ing the forest and repairing watersheds should be able to create as many small jobs as the historic establishment sector. Ironically, the silviculture sector's coastal experience has been that the

number of tending jobs has fallen since FRBC became the main funding source for intensive work.

There is really a third technical section—silviculture surveys—which are required

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Figure 1- Establishment jobs on Crown land

Establishment activity	Total 1994 dollars spent	Percentage labour	Average season's income	Number of people in small establishment jobs
Mechanical	\$ 43,203,006	45%	\$ 35,000	555
Burn	\$ 14,991,718	85%	\$ 15,000	850
Chem	\$ 856,947	75%	\$ 40,000	16
Other	\$ 11,771,907	75%	\$ 10,000	883
Nursery growing	\$ 45,315,540	45%	\$ 12,000	1699
Shipping	\$ 2,517,530	45%	\$ 40,000	28
Cold storage	\$ 2,517,530	45%	\$ 35,000	32
Plant	\$ 89,003,536	85%	\$ 10,000	7565
Survey	\$ 14,574,210	95%	\$ 22,000	629
Manual brushing	\$ 41,503,980	85%	\$ 10,000	3528
Chemical brushing	\$ 9,988,800	65%	\$ 16,000	406
Total people in establishment				16,192

Figure 2- Distribution of tending jobs on Crown land

Tending	Total 1994 dollars spent	Percentage labour	Average season's income	Number of people in small tending jobs
Spacing	\$ 26,949,126	80%	\$ 20,000	1078
Fertilizing	\$ 1,108,032	10%	\$ 45,000	2
Pruning	\$ 5,798,325	85%	\$ 20,000	246
Total people in tending				1327

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for both tending and establishment prescriptions and reviews, both before and after treatments. Prescription work since FRBC has resulted in new employment in this sector, through prescriptions for watershed restoration. Since the total dollars spent in this sector in 1994 is not divided between tending and establishment, I include these 600 jobs in the establishment numbers, even though some of them are a part of the tending jobs. (For a rundown of establishment jobs on Crown land, see Figure 1. Totals for silviculture dollars spent on Crown land in 1994 come from *Just the Facts*, BC Ministry of Forests and Forestry Canada, 1996.)

The number of dollars that constitutes an "average season's income" comes from a variety of sources, including extrapolating to 1994 from the Canadian Forest Service's 1987 publication *Economic and social aspects of tree planting in British Columbia: A survey of workers and contractors*, as well as from comparing information from contractors and workers in other companies with the numbers for those activities in our company, Brinkman and Associates.

The percentage of the dollars spent that goes to labour is also estimated from comparative conversations, and includes supervisors, cooks, payroll and office administration as labour. FRBC's backlog program has the potential of adding 10 to 25% to these 10% establishment jobs.

The amount of silviculture money spent on private land is not readily available, so I have extrapolated it from the amount spent on Crown land based on the ratio of harvesting. (For an overview of the distribution of tending jobs on Crown land, see Figure 2.) In 1994, there were 160,008 hectares of Crown land harvested to 30,238 hectares of private land harvested.

While on some private tree farms, the number of silviculture dollars per hectare harvested is claimed to be greater than on Crown land, on small private land-holdings there are sometimes no silviculture dollars spent. Therefore, I assume that only 30% as much silviculture is done on private land on average, as on Crown land, for each hectare logged.

The estimate of silviculture dollars spent on private lands is therefore \$17,580,858 (i.e., 30% of 30,238 divided by 160,008). Assuming a similar array of activities and distribution of small jobs, this adds another 1004 people, for a total of 18,524 people engaged in silviculture in 1994.

The fact that a total of \$327 million was being spent on silviculture, creating small jobs for over 18,500 people, has not been well understood. Since the existing sector is primarily labour, this is equivalent to 9000 big year-round jobs.

Some people in these seasonal, weather-dependent jobs, rely on the Employment Insurance net for their off season. Changes in EI are far more radical than most people realize. Not only are employers and employees making 167% higher contributions (to a fund that is running a surplus), the maximum claimable dollars and the number of EI weeks you qualify for has been reduced, plus the number of weeks you have to work to qualify has been increased.

WESTERN REPORTS

Ironically, these increases only really affect Canada's seasonal workers, mainly those who work in the seasonal resource sectors on which the Canadian economy depends. Once again, the fishers, farmers, loggers, planters, tourers and miners, are being taxed to support those who are closer to the lobby action — the bankers, civil servants and service sector, whose EI contributions went down. Moreover, the IWA are demanding that their people earn the same dollars for their smaller work year.

However, if the silviculture industry was allowed to be the champion in creating new small jobs with FRBC's \$400 million — at \$18,500 each per year — it would create the 21,000 new jobs that Clark is targeting. The silviculture industry is currently conducting an FRBC-funded study of the industry. This study will re-discover how silviculture workers have been creative in combining silviculture jobs with other activities, such as going to school, working in construction trades, ski patrolling, eco-touring, pursuing arts and crafts, farming, fishing, and service jobs. Not only does this provide many people with a healthy outdoor lifestyle, but they have a life because a small job does not overwhelm and absorb the rest of the person's life.

The new Silviculture Workers Association found in an initial survey that only about 20% of existing silviculture workers want the big year-round local jobs, with which FRBC has been determined to replace silviculture's small jobs. With 40% of its expenditures going towards big jobs for the administrators, FRBC's people who are new to BC's silviculture industry have a lot to learn about little jobs from the established silviculture industry. ▲

Résumé

Jeremy Rifkin, auteur reconnu pour "The End Of Work", vient d'aviser le Parti Nouveau Démocratique du Colombie Britannique que la seule façon de combattre le chômage technique est de créer plus d'emplois petits et une plus courte année de travail ou semaine de travail. En partageant un nombre fixe d'emplois entre plusieurs d'ouvriers, le \$400 million contribué par le programme FRBC pourra créer 21.000 plus d'emplois petits pour l'industrie sylvicole. Cela permettra le gouvernement provinciale d'atteindre le but d'augmenter les emplois forestiers. FRBC voulait remplacer les petits emplois sylvicoles par des grosses emplois permanents, mais le nouveau association d'ouvriers sylvicoles a découvert récemment que seulement 20% des ouvriers sylvicoles veulent un emploi permanent.

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Survey reveals industry skepticism

Roy Biv

BC silviculture contractors don't trust the provincial government, they don't think out-of-province contractors are a threat, and they're split on what the future holds for their industry, according to the Western Silvicultural Contractors' Association. The WSCA based these conclusions on a contractor survey taken at the association's annual conference in Victoria in February.

There was unanimous agreement that the industry faces a major restructuring.

Ninety percent of contractors polled said they did not think BC's government was supportive of the silviculture contracting industry. Contractors were skeptical in their assessment of the IWA's recent interest in silviculture contractors, too, with 80% of those polled stating they did not think the union was supportive of the industry. At the same time, contractors were

clearly split almost 50-50 on whether their industry clients were supportive of silviculture contracting.

Most contractors (60%) don't think the silviculture industry is healthy at the moment, and another third don't think things will improve. There was unanimous agreement that the industry faces a major restructuring with 60% of contractors polled believing that industry was prepared for it.

Contractors are for the most part (75%) behind the Forest Renewal BC mandate, but 90% of them were disappointed in the corporation's performance so far. Still, 64% see FRBC as an opportunity for the contracting community in spite of almost everyone asked saying the FRBC delivery model was not working. There was unanimity amongst contractors for a voice on the Forest Renewal BC Board of Directors, as well as the Forest Sector Strategy Committee. At the same time, 72% stated they did not think their industry was being listened to by government and policy makers. Roughly the same number agreed that government did not understand silviculture contracting in the province.

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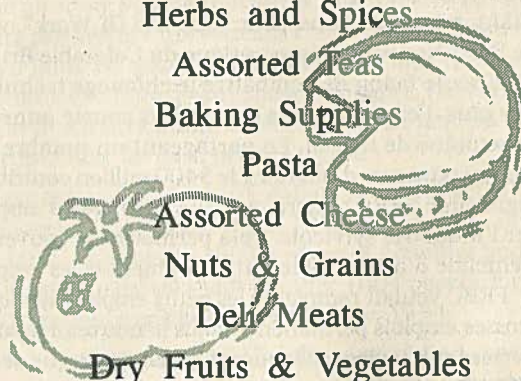
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Silviculture contractors do not see out-of-province contractors as a problem for the BC silviculture industry.

Three quarters of the contractors wanted to see an end to the low-bid system of awarding government and FRBC contracts, with the 25% remainder disagreeing. The majority of contractors (80%) supported the idea of government and FRBC projects being tendered as bid proposals. There was near unanimous support for an increased role for industry in tendering and selecting contractors for FRBC work.

Silviculture contractors do not see out-of-province contractors as a problem for the BC silviculture industry, according to the survey results. More than half of contractors do not see certification of silviculture workers as an appropriate strategy for the industry.

Sixty percent of contractors asked don't think MOF silviculture contracting standards are uniformly implemented across the province. Seventy-two percent don't think MOF camp standards

are adequately enforced across the province, and half believe WCB standards suffer from the same inconsistency.

In keeping with the spirit of this survey, the WSCA has retained the services of Coopers and Lybrand Consulting, with funding from FRBC, in order to develop a profile of the BC silviculture industry and its workforce. WSCA sees this profile as key to increasing understanding amongst policy- and decision-makers of the scale, structure and capacity of the industry and its workforce; developing strategies to address challenges facing the industry; and assessing the impact of government initiatives on the industry. Surveying began at the end of February and the results are expected in April. ▲

Résumé

Le WSCA vient d'organiser un rapport des entrepreneurs à la conférence annuelle de l'association à Victoria cet février passé. Les résultats démontrent que 90% des entrepreneurs pensent que le gouvernement du Colombie Britannique ne soutient pas aux entrepreneurs de l'industrie sylvicole, et que 60% ne croit pas que l'industrie est saine en ce moment. L'industrie va sans doute se soumettre à une grosse révision.

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