

# CANADIAN SILVICULTURE MAGAZINE

vol.4 no.4

FALL 1996

**in this issue:**

**Sheep grazing  
for silviculture**

**Mechanical  
site preparation  
in BC and  
Ontario**

**Swedish  
silviculture  
trends**

**plus regional  
silviculture  
reports**



	Canada Post Postage paid	Postes Canada Port payé
<b>Bulk</b> <b>En nombre</b>		
<b>third</b> <b>troisième</b>		
<b>class</b> <b>classe</b>		
0039248098		
Vancouver, B.C.		



## ON THE COVER

Cover photo by Dennis Loxton

## STAFF

### Editor

Dirk Brinkman

### Managing Editor

Gordon Murray

### Assistant Editor

Patsy Kotsopoulos

### Contributors

BC Workers Compensation Board, Roy  
Biv, Pierre Dubois, F.F. Foreman,  
Wanson Hemphill, John Lawrence, Joyce  
Murray, Aaron Schneider, B.J.  
Sutherland, Alan Waters,

### Production Manager

Carmen Mills

## ADVERTISING

### Advertising Manager

Neil Monckton

Advertising enquiries should be forwarded  
to: Box 65506, Station F  
Vancouver, BC, V5N 5K7.  
Tel: 604.253.4307  
Fax: 604.875.1403  
E-mail: chaos@axionet.com

## SUBSCRIPTIONS

### Subscriptions Manager

Samantha Monckton

Subscriptions are \$18 for one year or  
\$30 for two years. These prices do not  
include GST. Please make your  
payment payable to the *Canadian  
Silviculture Magazine* and mail your  
request to: Box 65506, Station F  
Vancouver, BC, V5N 5K7.

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

©1996 CSM Inc.

# CANADIAN SILVICULTURE MAGAZINE

Fall 1996, Volume 4/Number 4, Issue #13

## DEPARTMENTS

Editorial— Floor disturbances	6
SilviNews— Notes from the world of silviculture	9
Biodiversity Briefs— Global warming updates	10
SilviTools— New products, publications, Web sites	11
SilviDates— Who, what, where, when	49
Notes from the Ledge— Graphic commentary	50

## FEATURES

Site preparation and seedling survival	15
•How site preparation impacts on soil quality, and consequently, seedling development in Ontario.	
Changing expectations impact on site prep in BC	24
•A report on the effects of the Forest Practices Code on silviculture in the BC Interior.	
Studying sheep browsing for silviculture	28
•Why our wooly friends present us with a worthwhile silvicultural tool.	
Commotion to action: 1996 WSCA conference	47
•An overview of Western Canada's biggest silviculture conference with notable quotes.	

## REGIONAL REPORTS

National	31
Ontario	36
Québec	38
Nova Scotia	39
P.E.I.	42
Western Canada	44

Send correspondence • articles • subscriptions  
• events • advertising enquiries • listings to:

**Canadian Silviculture Magazine**

**Box 65506, Station F**

**Vancouver, BC**

**V5N 5K7**

**E-mail: gordon\_murray@mindlink.bc.ca**



# Do not disturb?: Site preparation and the forest floor

Dirk Brinkman

**W**hile burning is declining due to environmental regulations in Canada, mechanical site preparation is increasing. Site preparation innovation in Canada has developed a variety of carefully structured mounds. Most of this site preparation has evolved from what works in the field, and as a supporting treatment for seedlings grown in second-generation containers from styro block to hardwall plastic. Whether or not mechanical site preparation is the optimum site treatment for growing seedlings with better lateral root egress is an important question to consider.

My recent tour of reforestation industry facilities in Sweden included a visit to Anders Lindstrom's Swedish Hall of Root Horrors. Displayed there was a copper-coated seedling, showing lateral root egress and over-all root form as good as any Swedish air-pruned seedlings. Copper coating, while controversial and currently banned in Sweden, is increasingly

being used in Canada to prune roots at the side of the container, improving lateral root egress after planting.

Additionally, Canadian foresters have been switching to shorter wider con-

**...in Quebec, boot  
screefing is banned  
because it leads to  
knee injuries...**

tainers (e.g., 410, 415 D, Drader, and larger stock), while reducing the more root bound 2+0 stock. In combination with this shift to seedlings with more lateral root egress, site preparation thinking is changing.

One of the more common site preparation tools prescribed by foresters—planter scalps or screefs—is disappearing in some jurisdictions. In Quebec,

boot screefing is banned because it leads to knee injuries. Screefing is also disappearing in western Canada because seedlings planted directly into the forest floor do better: when the forest floor is undisturbed and uncompacted by winter logging, all of the nutrients, mycorrhizae, warmth, moisture and oxygen are present for a healthy seedling's optimum growth.

Ron Elder, a consulting RPF, and Dave Lloyd, RPF and manager of Pelton Nurseries, have been delivering a workshop called "Towards Excellence in Reforestation" to teams of foresters, implementation contractors and reforestation supervisors around BC. This workshop covers basic key factors required to achieve successful reforestation. During these workshops, they have visited previous plantations where they are able to point out thriving seedlings planted in the undisturbed forest floor. At those areas, foresters reduced screefs and changed their site preparation practices. ♦

---

## BC misconceptions hurt silviculture and forest sectors

Dirk Brinkman

**I**n recent months, several misconceptions have arisen from statements made by Forest Renewal BC (FRBC) officials, Minister of Forests David Zirnelt, Premier Glen Clark and the news media.

### **BC's silviculture industry**

**Misconception #1.** *BC Silviculture workers are from out of province.* Minister of Forests Dave Zirnelt justifies restricting the silviculture industry's access to FRBC projects by claiming, "If you let anyone bid, a lot of jobs would be going out of the province" (*Vancouver Sun*, Sept. 13, 1996). But virtually no brushers, pruners, spacers or surveyors are non-BC residents, according to a 1987 labour profile study by Stevenson, Kellogg, Ernst and Whinney. The last federal labour study indicated

that less than 13% of BC's treeplanters come from out of province. Zirnelt's own forest ministry hired several times that percentage from out of province in the past two years. Moreover, inter-provincial labour mobility is encouraged in countries such as Sweden as a way to increase the health and productivity of the forest sector.

**Misconception #2:** *The silviculture industry is new.* Some members of the WSCA have been in business continuously since 1970. The WSCA, founded in 1981, has represented 75% of the silviculture contract work in BC since 1985. There are over 15,000 seasonal but established silviculture workers employed in the industry, most of whom are keen to work longer seasons.

*...continued on next page*



**Misconception #3: FRBC has increased the silviculture work available to the silviculture industry.** Since FRBC commenced operations, the amount of spacing and pruning work available to traditional silviculture contractors and their workers has dropped off so radically that some contractors went bankrupt in 1996, and many workers have left the industry permanently. FRBC programs did not simply replace FRDA and Ministry of Forests silviculture programs—instead, they attempted to turn silviculture into a “job creation” program. FRBC has displaced silviculture workers through its attempts to channel silviculture work to displaced forest workers and others.

**Misconception # 4: Forest workers want silviculture jobs.** FRBC is a successor to BC 21's Forest Worker Development Program, which followed federal make-work programs like NEED and EBAP. Long experience with these and other programs has shown that only 10-15% of displaced forest workers are seriously interested in silviculture work, and less than half of these stick it out after they have tried it.

**Misconception # 5: Silviculture work is low-skilled labour and anyone can do it.** Contractors find that only a small percentage of applicants are suited for silviculture job characteristics: hard physical labour in all weather conditions, often in remote locations. To do a good job, a silviculture worker needs to learn a variety of skills, and maintain high quality and productivity in difficult terrain. This process takes several years of training and experience.

**Misconception # 6: There are not enough silviculture contractors or workers so, therefore, FRBC's priority is to help finance and train new silviculture contractors.** BC has over 500 silviculture contractors, which means the industry is already very fragmented. Most of them have the capacity to do more work than is available to the industry, and have a surplus of underemployed, skilled, silviculture practitioners.

## FRBC's “new” backlog reforestation program

**Misconception # 7. FRBC's recently announced planting program is a new program** (“North bags \$250 million FRBC package,” *Vancouver Sun*, September 29). The program “to eliminate the backlog by the year 2000” commenced in 1988 and successive governments have continued the program.

**Misconception # 8: FRBC's backlog program will add reforestation to the north.** Having FRBC fund the BC Ministry of Forest's “backlog” reforestation program does not add dollars to reforestation in BC. It uses FRBC funds to replace an ongoing MOF program. An FRBC founding principle that all FRBC programs must be “incremental” to existing silviculture commitments is violated by this program.

...continued on next page

## AIR PRUNED SEEDLINGS

now available from your favourite BC Seedling Nursery

Progressive forest nurseries from every region of the province have adapted air pruning technologies from New Zealand and Sweden to conditions here in British Columbia

That means you can now order Air Pruned Pine and Spruce from your preferred seedling supplier for the 1997 planting season.

The block has 410 designation, with 112 cells per block, and a cell volume of 80 cc. This block is recognized by the Ministry of Forests as “PAB 410.”



**For more information, contact your regular seedling supplier or Airblock BC:  
1-888-AIR-PRUN (1-888-247-7786)  
or (604) 669-8333.**



...continued from previous page

**Misconception # 9:** The areas FRBC is planning to plant are "unsatisfactorily replanted." These areas have never been reforested. They are classified as Not Satisfactorily Restocked (NSR) because they did not regenerate naturally. Reforestation today is 97% successful in establishing species mixes appropriate for each ecosystem.

**Misconception # 10:** There are one million hectares NSR. There are more than 3 million hectares of NSR reported in Table 4 of the Ministry of Forests 1994-5 Annual Report. Millions more hectares of forest land are classed as "impeded" and require intensive silviculture treatment.

**Misconception #11:** Only 110,000 hectares of NSR need reforestation. The 110,000 hectares selected for FRBC funding is a "made in Victoria" estimate of what is left from 1988 figures. In light of today's increased forest product prices and declining harvest levels, a much larger area should be planted for future harvests.

## **FRBC gives "surplus" money to BC government**

**Misconception #12:** FRBC has surplus funds. FRBC's funds could only be considered "surplus" if there is no future need for the forest improvements and labour market adjustments that the funds are intended to finance. Yes, the FRBC bank account filled up more quickly than expected. However, there could be years when forest product prices are depressed, FRBC income dries up, and reserves will be needed. The original intent for FRBC was to prevent so-called surpluses from being plundered so that, for once, the public's resource is managed with a long-term view. This intent was clearly violated.

**Misconception # 13:** FRBC has failed to deliver on its promises. The promises about what FRBC can do and how quickly it can be done, were made by politicians for political reasons. FRBC itself is a Crown corporation, which is

experiencing the normal growing pains of a new organization attempting to ramp-up quickly, while balancing di-

## **...in light of today's increased forest product prices and declining harvest levels, a much larger area should be planted for future harvests...**

verse expectations. FRBC does have the potential to make BC the world leader in forest renewal, as long as it is not diverted to being used solely as a job creation mechanism or as a substitute for previous commitments to fund intensive silviculture.

**Misconception #15:** The maximum FRBC needs is \$400 million dollars per year. Once the FRBC organization is in place to fully administer program mandates, \$1 billion dollars invested per year would be amply repaid through future economic, environmental and employment benefits. Millions of kilometres of drainages need restoration. Millions of hectares need tending. Hundreds of thousands of hectares need reforestation. The resource value can be escalated through additional processing in BC. Displaced forest workers need income as well as training to find suitable alternative employment. Silviculture workers, First Nations people and others will benefit from silvicultural training. FRBC's investments will return a future stream of earnings from direct increases in forest product exports, tourism, fishing, special forest-products harvesting, as well as many other social and environmental benefits.

The public must insist FRBC's funds not be stripped. FRBC needs to get on with its job so that our forest resource can create sustainable benefits for all of us. ♦

## **CANADIAN SILVICULTURE MAGAZINE**

**The Canadian Silviculture Magazine welcomes new writers, photographers and illustrators, and encourages a diversity of regional perspectives.**

### **1997 Publishing Schedule**

Issue	Submissions Deadline	Themes
Winter '97	November 15, 1996	thinning, seedling/root development
Spring '97	February 7, 1997	planting, nurseries
Summer '97	May 23, 1997	site preparation, restoration
Fall '97	August 29, 1997	eco-standards, safety, forest management

**If you are interested in submitting in English or in French, please contact Gordon Murray at:**

Snail-mail: PO Box 65505, Station F, Vancouver, BC, V5N 5K5

Tel: 604-877-1403 or Fax: 604-875-1403 or E-mail: [gordon\\_murray@mindlink.bc.ca](mailto:gordon_murray@mindlink.bc.ca)



### Environmentalists take ministry to court

Arguing that the Ontario government is failing to live up to the Crown Forest Sustainability Act (CFSA) and a 1994 Environmental Assessment (EA) board ruling, a coalition of Ontario environmental groups asked for a logging injunction. The MNR has maintained that its current planning process for forest management lives up to the spirit and the intent of the CFSA and the EA ruling. The judge would not issue an injunction, but did say there were matters in the larger suit for the court to consider further. The date of a hearing has not been set.

The case could have far reaching effects—the environmentalists say that current logging plans are illegal because the CFSA states they must be prepared in accordance with an MNR planning manual. But the manual has never been completed. A negative ruling on this issue could affect 40% of the logging in Ontario.

### Tolnai wins award

Steve Tolnai, Weyerhaeuser chief forester and president of the Canadian Institute of Forestry, has been given the first annual Forest Management Excellence Award by Forest Renewal BC. Tolnai was cited for promoting innovation and responsibility in silviculture practices during his 37-year career as a forester.

*Canadian Institute of Forestry*

### Bear encounters

The approximately 15,000 silviculture workers working in BC's bush, encountered more grizzlies and black bears in 1996 than in any previous year. "This was a phenomenally bad year. They never got out of the low country. Things greened up surprisingly late," said Sean Sharpe, Wildlife Biologist for the Ministry of Environment, Prince George. "Despite that, we had fewer incidents with silviculture workers than average. Hopefully, this is the result of education." Over the last few years WSCA, MOF and WCB have made a concerted effort to communicate bear safety information. More of BC's vegetation-munching sheep also encountered these bears. Six sheep were killed by an underweight grizzly looking for an easy meal. BC's Carnivor and Sheep Browsing program kept track of this unusual year.

### Ontario MNR slash and burn

The Ontario MNR's forestry program budget for 1996-97 has been cut to \$75 million from \$152 million last year. Hundreds of forestry employees in northern communities have been laid off, and MNR offices have been closed or consolidated. The MNR has ceased all direct planting programs, and is selling its nurseries. The forest industry will be responsible for conducting and inspecting its own silviculture programs with MNR "spot checks", and third party audits every five years. OFRI, the forestry research arm of the MNR, has

had its budget cut by two-thirds, and will no longer be conducting any specific seedling or silviculture research.

### Swedish value-added losing value

The Swedish press reports that numerous small re-manufacturing plants have been forced to declare bankruptcy due to low demand for furniture specialties. However, a recent visit to Sweden showed that foresters there are still busy writing proposals to the European Union for funding innovative value-added projects to stabilize Northern communities.

*Highballer and CSA*

### Quota effect on silviculture

Canada's five-year softwood quota allocation, which limits the volume of exports to the US, is good news for lumber producers. This will control the cycle of harvesters overcutting their way into a price war in the US—Canada's main market. Like egg and milk quotas, this should keep prices high. In provinces with price-sensitive stumpage-formulas raising funds for silviculture (e.g., Alberta's FRIP and FRBC), the quotas will raise the average amount of stumpage collected. Unfortunately, the FRBC Board of Directors may have already given this future "surplus" away.

*Globe & Mail and CSA*



(roots are air pruned)

### A Canadian container system that is:

- soft-walled for completely natural seedling root formation
- media and container all in one
- always a plug
- plantable any time after germination
- designed to enhance plantation establishment

CONTACT: Jiffy Products (N.B.) Limited  
PO Box 360, Shippagan, N.B., E0B 2P0  
Phone (506) 336-2284 Fax (506) 336-1844

Grow your  
seedlings  
with

**Jiffy**





## US finally heeds global warnings

At this summer's climate change conference, the US reversed its position and committed to binding national limits on CO<sub>2</sub> emissions. Canada has supported mandatory targets in word, but its actions have been lacking. In fact, Canada has been one of the worst in the world in meeting the international pledge to reduce emissions to 1990 levels. Now that the US has endorsed the limits, Canada can proceed with national regulation without the fear of becoming "non-competitive". We may also be one step closer to funding for silviculture sinks to reduce Canada's net carbon emissions.

In an interview after the conference Canada's environment minister, Sergio Marchi, said that a study of the MacKenzie River Basin shows that "changes in climate are already starting to affect our environment and ways of life, particularly in the Canadian Arctic." The area has experienced a warming trend of 1.5°C this century, thawing permafrost and lowering lake levels.

*Canadian Press*

## Forest bacon

Interfor is counting on Swedish pig's blood to discourage black-tailed deer from browsing on cedar seedlings in its tree-farm license near Johnstone Strait. Plantskydd is 87% pig's blood in powder form with a smell that repels vegetarian deer. It is mixed with water, and then seedlings are dipped in or sprayed with the compound. The company has previously tried everything from wire mesh to cougar urine to find a cost-effective method of controlling deer browse.

*Vancouver Sun*

## Dispatches from the eco wars

1995 may have been the hottest year on record weather-wise, but 1996 is burning up on the green battle front.

### Night movements

Jack Munro, chair of BC's Forest Alliance—an industry lobby group—woke up on the fall equinox to find his lawn was covered with ten bags of horseshit. Said Munro, "Bunch of degenerates! What am I supposed to do with some damn manure?"

*The Province*

### Temagami roads reblocked

Bob Rae may have been voted out in Ontario, but the road he blockaded is once again being blocked in the Temagami wilderness.

### Spotted owl recipe

Madison's *Canadian Lumber Reporter* published a Skawahlook woman's recipe for smoked spotted owl. How did the Western Canada Wilderness Committee react?: "Tasteless!"

*Canadian Lumber Reporter*

### Green trees and ham

In the town of Laytonville, California, parents are campaigning to drop a popular children's book, Dr. Suess's *The Lorax*, because it is anti-logging. In Meridian, Idaho, the school board guidelines state: "Discussion should not reflect negative attitudes toward business or industry."

*The Observer*

### BCMOF can't hear Singing Forest

The Singing Forest continues to be logged while the Forest Service remains aloof to every appeal of an increasingly wide range of voices. This includes a recent environmental delegation from Japan, not exactly a mainstream country for the environmental movement.

*Nelson Daily News*

## Hiring freeze bodes ill

BC's Forest Practices Board, which investigates complaints under the Forest Practices Code, is down to one inspector due to a BC government hiring freeze. In response to a Sierra Club request for an investigation, the inspector wrote, "We do not have the staff available to conduct those assessments immediately... we will be unable to conduct any investigation in the near future if we decide to investigate."

*Vancouver Sun*

## Mac Blo let off the hook

The provincial Crown prosecutor has dropped its case against Macmillan Bloedel for damaging a salmon creek in Clayoquot Sound. When the province laid the charges two years ago, then-environment minister Moe Sihota declared that this case heralded a tougher government stand against companies breaking environmental laws. Despite proof from MOE investigators that road material had eroded into the stream and completely blocked it under a crossing, the Crown prosecutor sought more evidence from further experts. One stated that only a small amount of road gravel was present in the stream, and the case was stayed.

*Friends of Clayoquot Sound*

## Unexplored biodiversity

Scientists estimate there are of tens of thousands of undiscovered species in Canada's old-growth forests. This fact amplifies the gentle reprimand of BC's Forest Practices Board to the Sunshine Coast Forest District, where "logging was approved within the habitat of an extremely rare, probably endangered species of mushroom." MOF was told to "ensure adequate opportunity exists for consideration of substantial information about biological values... before an operational plan is prepared." This case may have far-reaching effects if environmentalists pitching unexplored biodiversity can throw foresters another learning curve.

WSCA



## Air pruning blocks adapted for BC nurseries

AirBlock BC Ltd. is a new company formed to bring Air Pruning to Western Canada. AirBlock BC has adapted air pruning technology from New Zealand and Scandinavia to the standard benches, nursery equipment, and biological requirements of BC nurseries.

The Ministry of Forests has recognized their first model for the BC market as PAB 410. AirBlock BC's Arne Aiking says, "Air pruning is no longer used strictly on pine—we already see spruce being grown in AirBlocks in New Zealand, Sweden, Finland and Alberta. The slits give the roots improved access to

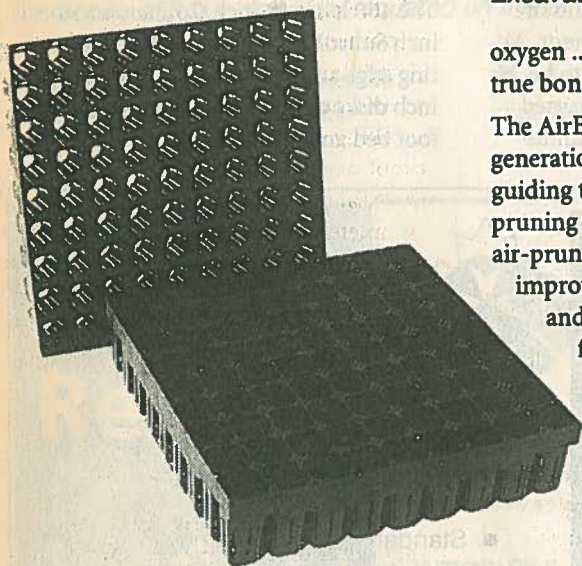


Excavator-mounted V.H. Mulcher head roto-tills each spot.

oxygen ... so critical for all species; a true bonus of air pruning."

The AirBlock 410 incorporates second-generation air pruning, which involves guiding the roots to the slits, so that the pruning is more effective. Seedling with air-pruned root systems generally show improved growth in the early years, and the mature tree is more wind-firm in the forest.

Contact: AirBlock BC at toll free 1-888-AIR-PRUNE (1-888-247-7786).



BCC sideslit air-pruning trays.

## New Zealand studies BC site prep tool

The Logging Industry Research Organization (LIRO) of New Zealand has completed a study of the V.H. Mulcher excavator-mounted site-preparation tool, designed and built in BC. The roto-tilling head blends the organic and mineral soil, breaking up roots and vegetation. It can also be adjusted to produce specific sizes and heights of mounds (or depressions) to treat wet or dry sites. The draft results of the LIRO study are summarized below:

The site's two distinct slope classes were 60% of site 0-15 degrees, 40% of site 15-25 degrees. The soil and weather were

...continued on next page

## WEST-NORTHWEST FORESTRY LTD

### "VH MULCHER"

◆ SPOT FOREST TILLING/MOUNDING/BEDDING ◆

◆ VIDEO AVAILABLE ◆

**SALES & FORESTRY CONSULTING**

**Tim C. Van Horlick**  
President  
370 Armour Place  
Kamloops, BC CANADA  
V2H 1L2

Phone: (250) 578-6966  
Fax: (250) 578-6967  
Cel: (250) 371-7972

E-mail: v.h.mulcher@mail.awinc.com





...continued from previous page

very wet. Slash on the site would be described as heavy with an average of 88 m<sup>3</sup>/ha (59% of the site had a layer of slash). There was no standing vegetation or weed growth on the recently harvested site.

The conditions during the study were quite difficult with short runs between turns, steep gully sides, wet soils and heavy slash. The number of spots created per minute will be affected by all these factors. The rate of production observed— 3.25 spots per minute— should be able to be reproduced on most sites. Under better conditions the rate of production would rise.

The stocking rate has a substantial affect on the cost. Setting as low a stocking as is reasonable and getting the stocking on target will be crucial in getting costs down. At the observed production rate, a prescription of 800 spots per hectare

would result in a treatment cost of \$512/ha, while 1200 hundred spots per hectare would mean a cost of \$825/ha. (Based on a cost of \$125 per machine hour.)

The quality of the spots created was assessed. Of 224 spots checked, 96% were of acceptable quality. Of the nine rejected, seven were for slash in the mounds that was too heavy to remove or plant through and two were for insufficient or no mound.

After treatment, 53% of the site had soil visible. The treatment of the site did not change the slash volume. It simply moved it around a little and broke some of the pieces into smaller lengths. The site was easier to walk over after the treatment. With the exception of the spot mounds themselves (28% of the site), there was little change in the site disturbance indexes after treatment. Average mound height was found to be 29 cm. Soil shear strength was measured both in the mounds and in the undis-

turbed soil, and the V.H. Mulcher substantially increased the soil shear strength.

Contact: West-Northwest Forestry at (604) 578-6966.

## Alberta Pacific tests site-prep combo

Alberta Pacific Forest Products (APFP) has been conducting extensive site preparation trials of the Savannah 450 four-disc bedding plow, mounted on a Supertrak SK250B 4WD skidder with a slash rake. The Savannah 450 plow features vertical lift for tight turns and a hydraulic cushion release on the lift system for protection on rockier sites. It is suited to hilly sites, where frequent turning would limit production with a trailing machine.

The 450 has a 48-inch Coulter, an 18-inch Subsoil Shank with replaceable cutting edge and four stump-jump, and 36-inch disks to throw up a substantial eight-foot bed and fill-in trench with loose top-

## TRUCK LEASING & RENTAL

Randy Burden  
District Rental Manager

British Columbia

Fax (604) 294-9653

Tel (604) 294-1351



a trimac company

*For all your project rental needs.  
We specialize in 4X4s and Crewcabs.*

FIRST IN FIRST AID



St. John Ambulance

- WCB Occupational First Aid Levels 1, 2 & 3
- Transportation Endorsement

- Standard and Emergency First Aid - Safety Oriented (WCB Level 1 equivalent); National certificate

### Speciality Courses

- First Aid for Wilderness
- WHMIS

- First Aid Kits for all levels

Over 20 Branches in British Columbia

**Call: 604-321-2651**

*Ask Andrea about our group rates  
when registering 8 or more people.*





*Savannah 450 sub-soil plow mounted on the Supertrak skidder.*

soil to provide thorough competition control to the planting microsite.

The plow is mounted on the skidder with the Savannah Quickhitch, which

has a 15-degree swivel when in working position and centre-locking mechanism that is activated when raised. It is well matched to the heavy-duty Supertrak SK250B 4WD skidder for high-production bedding and subsoiling applications.

The SK250B is custom built with Caterpillar components, including a 280HP diesel engine. The steering uses two double-acting hydraulic cylinders for full 35-degree left or right. Limited slip differentials are available for both front and rear axles as well as a no-slip rear differential and an oscillating front axle for maximum traction and stability.

APFP have treated over 750 hectares over the last two years with the Savannah/Supertrak combo, testing the equipment on aspen and spruce sites in severe conditions over all sorts of terrain—including up to 30% slopes.

...continued on next page

## GPS Rentals

Competitive rates

Only current products

Built-in purchase option



**Cansel**  
Survey Equipment

Trimble's #1 Survey & Mapping Dealer

**1-800-661-8342**

3751 Napier Street, Burnaby, BC

Phone: 604-299-5794

Fax: 604-299-1998



**Trimble**

THE GPS SOLUTION

## We've Got It All!

### HUNDREDS OF PAIRS

By numerous manufacturers, we now carry a very large assortment of rubber caulk boots, and replacement caulks. Come on down and see for yourself!



### CUSTOM PLANTING SHOVELS

4 styles of planting shovels are now available at NCI, including the lightweight, super strong **NORPAC** speed shovel.

### JUST SO MUCH TO SEE!

Planting bags, reflective bag liners, seedling and rain tarps, plot cords, cruiser vests, raingear, cordura planting bags, compasses, pruners, hip chains, clinometers, flagging and logging tape, girdling and clearing tools, tree marking paint, relaskops, the latest in GPS, field books, specialty printing and paper, hard hats, increment borers, drip torches, first aid kits, cruising prisms, gloves, axes, and much more!

<http://www.nevcros.com>

**NCI** FORESTRY  
MINING  
DRAFTING  
PLOTING

PRINCE GEORGE  
1849 1st Avenue, Prince George,  
B.C. Canada V2L 2Y8

Tel: (604) 564-6166  
Fax: (604) 564-6166

**NEVILLE CROSBY INC.**

VANCOUVER  
445 Terminal Ave., Vancouver, B.C.  
Canada V6A 2L7

Tel: (604) 682-7272 • 1-800-663-6733  
Fax: (604) 682-6133 • 1-800-673-6166

Check out over  
**2250 SITES**  
in showroom



According to APFP silviculture technologist Ernest Ramsen, the plow "throws a beautiful berm" in sandy soil. However, APFP is still experimenting with how to get the best results on sites with hard clay or heavy slash. The organization has been trying various modifications of the equipment such as removing the standard coulters and installing nitrogen cylinders for improved "stump-jumping" abilities on spruce sites that have large stumps. Although APFP is especially pleased with the results on aspen sites, they have noticed the plow tends to promote aspen competition on some spruce sites. They plan to continue testing the equipment on an additional 350 hectares in 1997.

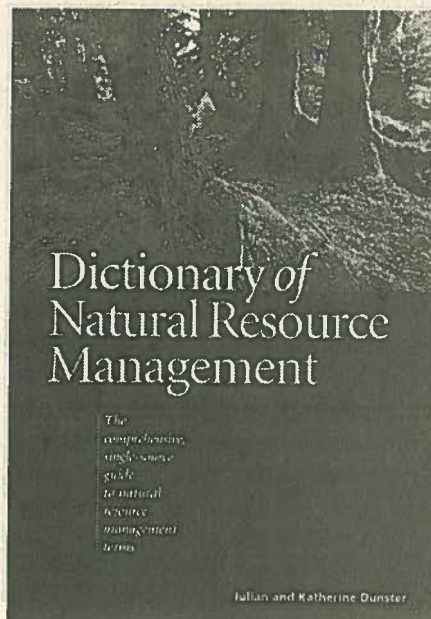
Contact: Savannah Forestry at (912) 964-2214 and Supertrak at (813) 637-7488.

## New publications

### *Dictionary bridges language gap between fields*

Communicating effectively with people in other natural resource fields is a priority for many people in forestry and forest management. Julian and Katherine Dunster's new *Dictionary of Natural Resource Management* helps bridge the language gap between forestry and other fields in natural resource management.

- Get a clear understanding of current working definitions: the dictionary holds over 6,000 terms from all major natural resource management disciplines.
- Master problems that commonly occur during planning and hearings: the Dunsters supply full cross-references including opposites and related terms.
- Save hundreds of hours' research: unlike specialist dictionaries, which assume you're familiar with their fields (so supply narrow terse definitions), the dictionary provides full definitions, immediately understandable to members of other disciplines and laypeople.



- Timely information: the dictionary contains completely current definitions, including the new disciplines of sustainable development planning, conservation biology, landscape ecology and conflict resolution.
- Reliable and practical: the dictionary was developed by leading authorities with many years' practical and academic experience in natural resource management. It has been reviewed by key practitioners and academics in natural resource management around the world.

Contact: University of British Columbia Press at (604) 822-5959.

## Wired Forest

This section lists World Wide Web sites of interest to the silviculture community. Please send us information about your Web site or one you think would interest our readers. You can e-mail us at [gordon\\_murray@mindlink.bc.ca](mailto:gordon_murray@mindlink.bc.ca)

### [www.dowco.com/designnet/cfan](http://www.dowco.com/designnet/cfan)

The Forestry Advisers Network (CFAN) of the Canadian International Development Agency (CIDA) has a new World Wide Web site. Its purpose is to

stimulate thought on international forestry issues and to provide an opportunity for Internet users to discover what development initiatives CIDA has taken to meet the challenges facing the world's forests. The views expressed are not the official policy of CIDA nor of the Canadian government.

The site contains various documents describing CIDA-supported forestry projects in Asia, Africa and the Americas, papers on forestry issues, a gateway to other CIDA resources, and an international forestry discussion group sponsored by CFAN. CFAN is an informal network of professionals concerned about the future of the forests and the people who depend on them.

### [www.efi.joensuu.fi/publications/efinews](http://www.efi.joensuu.fi/publications/efinews)

The European Forest Institute has announced the first electronic issue of EFI's newsletter, *EFI News*, located at the address above. Also visit EFI's home page at [www.efi.joensuu.fi](http://www.efi.joensuu.fi)

### [www.cnie.org/nle](http://www.cnie.org/nle)

From the United States, the Committee for the National Institute for the Environment (CNIE) is making over 140 Congressional Research Service (CRS) environmental reports publicly available for the first time. Previously, CRS reports were only available to form positions on environmental issues. This new service is part of CNIE's electronic, online National Library for the Environment. Already, the information content of the library exceeds nearly all other online environmental information sources, according to executive director Peter Saundry. Online CRS reports cover topics on forestry, agriculture, marine resources, mining, biodiversity, pollution, water, energy, and international and other environmental issues. Specific members of Congress and their staff to policy reports are updated every two to three months.



# Site preparation affects soil quality and seedling survival in Ontario

B.J. Sutherland and F.F. Foreman

Post-harvest site preparation is a key step in the overall silvicultural planning cycle, which consists of harvesting, site preparation, reforestation (planting/seeding), and stand tending. The goal of site preparation is to create an environment that favours crop tree performance — from successful seed germination or seedling survival and establishment to rapid growth promotion. All environmental influences must be considered when designing silvicultural treatments that promote the early growth of planted conifers. Site preparation may be necessary to attain any of the following objectives: to facilitate regeneration operations so as to improve planting quality and reduce establishment costs; to redistribute, align, and in some cases, reduce slash; to reduce competition from residual vegetation; and to expose or cultivate mineral soil. Site preparation can also reduce the amount of organic matter and modify the microclimate (microenvironment).

The desired product of site preparation is the creation of microsites that are suitable for planting or seeding. A microsite is a portion of a site that is uniform in microtopography and surface soil materials. It can range in size from less than 1 m<sup>2</sup> (for seed, considerably less than) to occasionally over 5 m<sup>2</sup>. Microsites are dynamic in that their characteristics are ever-changing, imperceptibly or suddenly. Factors responsible for this dynamic are macro- and microclimate and microtopography (Figure 1a).

Macroclimate, the larger-scale (10-1000 km) atmospheric conditions that largely determine microclimatic conditions, consists of solar radiation (sunshine), precipitation, wind speed, and the temperature and humidity of the overlying air mass.



*Mixed wood site in Northwestern Ontario before and after disc trenching.*

Microclimate is the small-scale climate that develops upwards and downwards from the ground surface, where radiant energy and precipitation are received and dissipated. Microclimate fluctuates more or less greatly depending on weather conditions, terrain, cover of vegetation, and soil properties. Microclimate will certainly be influenced by site preparation.

Microtopography, the shape of the ground surface, is often characterized by mounds and depressions. Mounds and depressions influence the climatic regime owing to variations in their heights and frequencies, which, along with slope and aspect, tend to establish a mosaic of moisture, temperature, and nutrient conditions across a site. For example, removal of the insulating organic layer to expose the more conductive underlying mineral soil can significantly influence the daytime and nighttime soil temperature and nocturnal air tempera-

ture of the microclimate around a seedling (Figure 1b).

Improving a forest environment for regeneration by site preparation is accomplished by relieving the constraints to seed germination or seedling establishment and/or performance. Newly planted seedlings, for example, are vulnerable because the microclimate of the planting site is most extreme, invading plant species may create severe competition for resources, and seedlings may not be completely acclimated to site conditions, and may also be stressed during the transplanting process. Near-surface moisture deficits, root zone moisture deficits, and low surface and soil subsurface temperatures are major constraints to seedlings on many upland cutovers. Other stresses registered by seedlings reflect imbalances and/or extremes in light, nutrients, and soil or atmospheric chemistry. Microclimatic

...continued on next page



...continued from previous page

components that can constrain seed germination or seedling establishment and/or performance and that can be influenced by or influence the choice of the site preparation method are soil moisture and temperature, air temperature, and light. Other constraints are soil fertility, thickness of the unincorporated organic layer (humus, LFH, duff, or peat layers), and the biotic variables of harvesting residue and noncrop vegetative competition.

Soil temperature and moisture are two of the most important constraints to tree seedlings during the establishment phase and are highly interrelated: a change in one variable causes changes in the other. Heat and moisture are coupled in terms of their effect on plant growth and their role in establishing the microclimate at a specific site; however, water is frequently the most important environmental factor that influences the day-to-day variation in tree growth.

## Soil moisture

To attain high rates of seed germination, sustained, adequate levels of soil moisture are required. Seed should lie on a moist substrate with a relative humidity of 100%, to permit high rates of germination. For seedlings, water is the most important substance taken up by roots; water affects root growth and function directly and other factors (such as seedling nutrition, root aeration, mechanical impedance, and soil temperature) indirectly.

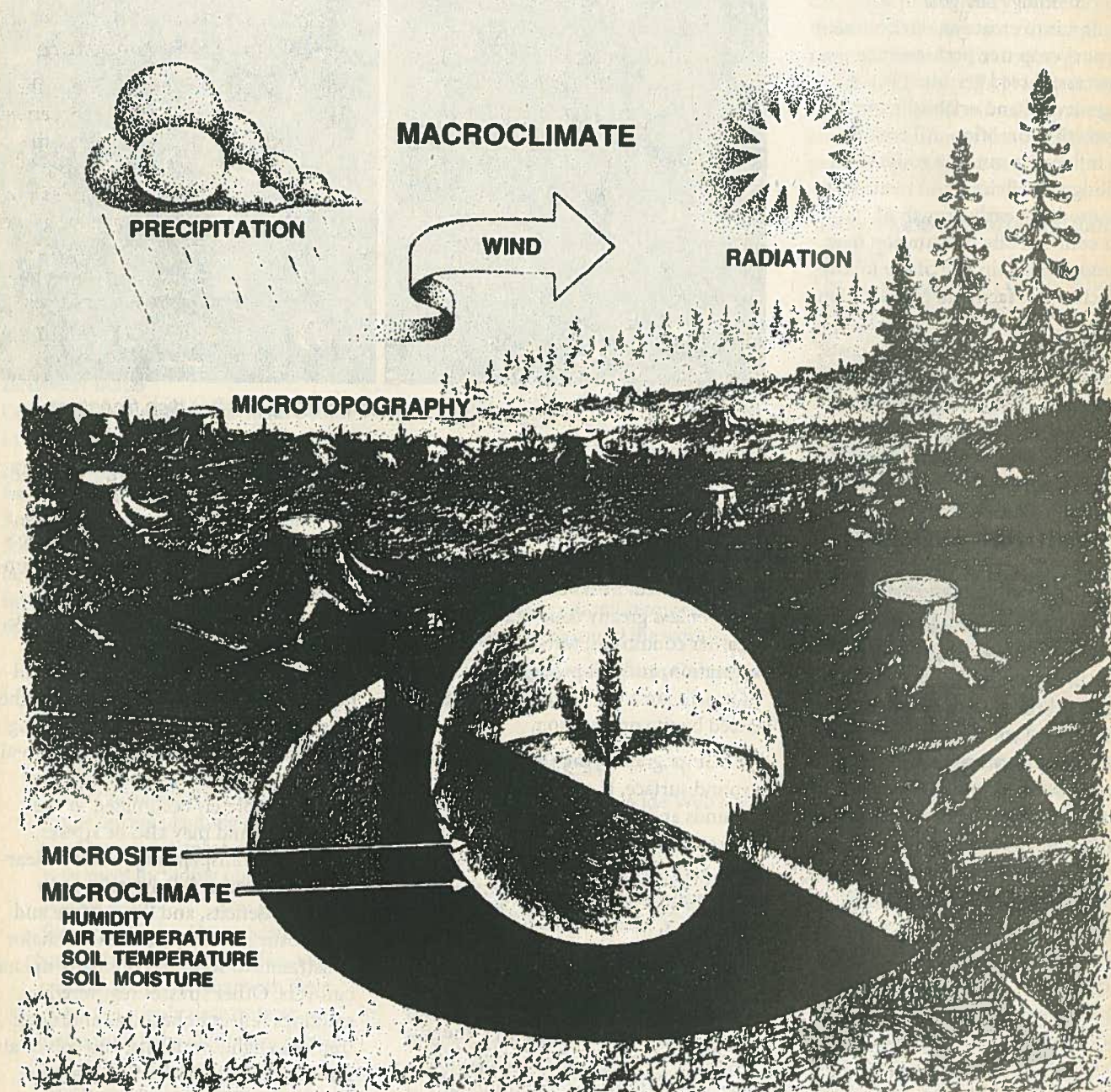


Figure 1a. Seedling environment.



Consequently, the initial survival and growth of seedlings depend on the establishment and maintenance of functional connections throughout the soil-plant-atmosphere continuum. Newly planted seedlings can exploit the moisture in only a small volume of soil. An imbalance in soil water relations results in slower growth and has the following effects:

- A shortage of moisture induces seedlings to close their stomata to limit water loss, which, in turn, limits photosynthesis.
- An excess of moisture reduces the oxygen required for root development by the creation of an anaerobic environment; it also causes the release of toxic substances by soil microorganisms that are highly injurious to seedling root systems.

Soil moisture regime is the actual rise and fall of available soil moisture; the major controlling factors include:

### Weather (macroclimate)

Some part of the precipitation enters the soil; solar radiation, temperature, humidity (vapor pressure deficit), and wind speed determine the evaporative demand for moisture.

### Site

The slope position and microtopography affect the movement of water within and out of the soil, whereas slope and aspect affect the amount of solar radiation received.

The vegetation cover competes for moisture through uptake and transpiration and by intercepting precipitation, some of which evaporates before reaching the soil.

Soil water retention and availability are affected by soil texture (pore size distribution determines the amount of soil water available to the plant); soil gravel and stone content, which affects the available water storage capacity (water available for use by plants); hydraulic conductivity (ability of the soil to conduct water); and root zone depth. Soil texture is one of the more useful variables for predicting soil water relations. Appendix A gives examples of how changes in soil texture alter soil water relations, the potential for frost heaving, and surface soil erosion and compaction.

Soil bulk density affects pore space; increasing bulk density (e.g., by compaction) reduces water storage and decreases infiltration and drainage capabilities.

The stone or coarse fragment content of the soil affects water storage, which decreases with increasing coarse fragment content.

Soil organic matter content can improve soil structure, making drainage and air permeability easier. A thick humus layer can increase the soil's resistance to compaction. Loose, undecomposed organic matter (e.g., a surface litter layer) has a poor water storage capacity. Organic seedbeds do not provide as stable a moisture source as does mineral soil.

### Positive effects of site preparation on soil moisture

Site preparation treatments modify the soil moisture regime either by conserving the available water or by removing the excess water. For seed germination, the near-surface availability of soil moisture must be assured. For planting, the goal is to influence the moisture conditions around seedling roots, primarily by providing the planting spot with relatively high and secure moisture availability without risking oxygen deficiency.

### Moisture conservation

Reducing transpirational losses through the removal or killing of competing vegetation. Moisture deficits in the rooting zone of conifers are largely

...continued on next page

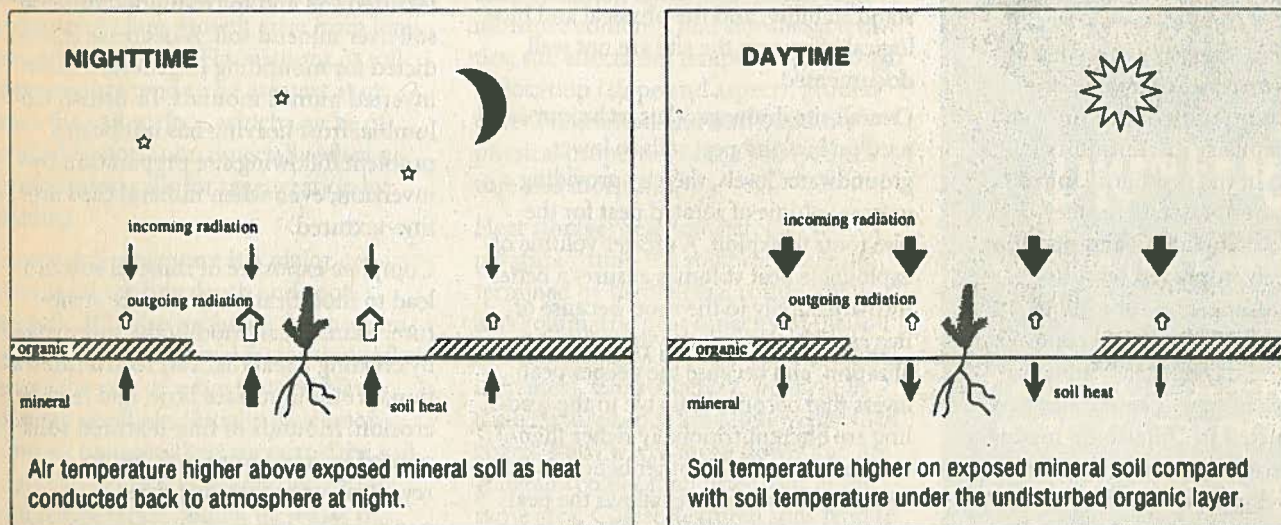


Figure 1b. Effect of mineral soil exposure on soil and air temperature.



*...continued from previous page*

the result of transpiration by competing vegetation rather than evaporation.

**Exposing mineral soil through the removal of the surface organic layers or moss cover.** The periodic and rapid drying of organic matter and feather moss or reindeer moss layers makes such material a poor seedbed for jack pine compared with mineral soil. Scalping, screening, trenching, or inverting to produce a depressed planting spot (below the original soil surface) can be particularly effective in the case of planting by conserving soil moisture in dry climates, as snow and rainfall accumulate in a depression. Even small microdepressions in the soil surface can improve moisture supply for seed located therein. In mounds, soil moisture may be enhanced below the inverted layers owing to capillary discontinuity in the humus layer and the fact that transpirational losses from vegetation are reduced once vegetation is controlled.

**Mulching to reduce evaporation.** A dried surface soil layer or undisturbed organic layer can be effective on coarse-textured soils in a dry environment. Soil evaporative losses can also be reduced by partial removal or manipulation of the vegetative overstory.

**Incorporation of the humus layers with the mineral soil by mixing.** This was found to increase the soil's water-holding capacity in the rooting zone. It will also improve soil moisture by reducing the density of competing vegetation, particularly in coarser-textured soils. On fine-textured soils, mixing can increase the infiltration of moisture and can avoid capillary discontinuity in raised beds. In the southern United States, soils on moderate to steep slopes subjected to compaction and puddling were similarly improved by cultivation (discing, bedding, and subsoiling). Mixing ameliorates soil physical conditions and improves oxygen availability for long periods of time. Few studies have been conducted in Ontario on mixing as a site preparation treatment. A study of bareroot jack pine and white spruce on a loamy fine sand found the least water stress and greatest stomatal "optimiza-

tion" in mixed soils, with the most stress in either bare mineral soil or control site preparation treatments.

Compacting soils to improve capillarity can help to increase available water capacity in sandy soils.

### **Moisture removal**

**Localized drainage.** Any site preparation method that produces raised planting spots, such as mounding or plowing, will drain microsites and create drier and thus warmer and better aerated

## ***...few studies have been conducted in Ontario on mixing as a site preparation treatment...***

planting spots for seedlings. The initial benefits of raised (mounded) microsites have been well documented for the cold, wet soils of Sweden at high latitudes. Mounding has also been advocated as having the potential for improving the survival and performance of outplanted seedlings in cold climates in parts of British Columbia. However, few studies on mounding have been initiated in Ontario, and the results to date have been less than conclusive. The long-term effects of mounding on tree and stand stability, and the physical and biological effects on the site are not well documented.

**Overall site drainage.** This technique is used on lowland peat soils to lower groundwater levels, thereby providing a greater volume of aerated peat for the tree roots to exploit. A greater volume of exploitable peat volumes ensures a better nutrient supply to the roots because of increased biological activity and mineralization, and because the deeper peat layers that become available to the seedling are often nutritionally richer than the surface layers. Another benefit is that lowering the water level allows the peat to warm up faster and reach higher temperatures earlier in the season.

### **Negative effects of site preparation on soil moisture**

Given the many factors that influence soil moisture, it can be difficult to achieve and maintain the positive effects of site preparation. Some of the negative effects of mechanical site preparation are as follows:

Droughty conditions can sometimes be made worse. Studies in British Columbia have indicated that raised planting spots may desiccate during dry periods, particularly in coarse textured soils. On these soils, inverted mounds may further accentuate desiccation because of the capillary discontinuity created by the inverted organic layer. Experience in Sweden with mounding indicates that in fine-textured soils, capillary discontinuity can result in an even greater risk of desiccation owing to the higher hydraulic conductivity at the surface (compared with that of coarse-textured soils), which can result in faster drying of the mineral cap. To overcome problems associated with mound desiccation, deep plant to place at least part of the seedling root system deeper than the upturned humus layer.

Depressed site-prepared microsites may be subject to seasonal moisture stresses as well as frost heaving. The risk of frost heaving may be increased, particularly on fine-textured soils. The potential for frost heaving after mounding is not clear. An increase in frost-heaving potential is possible on mounds of fine-textured soil and for mounded mineral soil over mineral soil. A decrease is predicted for mounding in general and on inverted humus mounds. In British Columbia, frost heaving has not been a problem following site preparation by inversion, even when mineral caps are fine-textured.

Complete exposure of mineral soil can lead to modification in surface structure. Rainfall can modify the soil surface by creating a seal that can retard infiltration, promote surface flow, and lead to erosion. Mounds of fine-textured soils created by hand were resistant to rewetting once they had dried.

Soil pore structure can be adversely affected. There is ample evidence that soil



disturbance and compaction caused by forest crop harvesting and extraction adversely affect tree growth and the long-term productivity of a site, but individual effects are variable and have not yet been well quantified. Recommendations have been provided on the choice of machines and running gear to reduce soil damage under various soil conditions, as well as on operation methods. The adverse effects of mechanical site preparation treatments on soil bulk density, primarily from studies in Nordic countries, have been summarized; as with harvesting equipment, the results were variable. A report on the effects of increased soil bulk density on southern pine species stated that negative effects may be masked by the initial positive response of seedlings to reduced woody competition. In Canada, it has been pointed out that scraping a fine-textured soil surface (e.g., by blading) can cause glazing, the closure of the soil pores at the surface, and inhibition of water penetration.

Soil rooting volume may be limited. Continuously plowed furrows may restrict tree root extension across furrows where soil water tables are high. This may limit rooting volume and lead to future windthrow problems.

## Soil temperature

Soil temperature influences seedling growth and survival by influencing physiological processes such as respiration and water uptake by roots. Constraints on plant growth arise from temperature extremes. Fluctuations in soil temperature tend to be greatest at or near the soil surface, which can be of crucial importance, especially when a prescription calls for regeneration by seeding.

Low soil temperature is a major constraint on rooting depth and root growth. It is also probably the most important environmental factor that influences the rate of water uptake. Newly planted seedlings initially have poor contact between their roots and the soil. This can be further aggravated by low soil temperature, which increases the viscosity of water and thus its resistance to flow. Higher soil temperature stimu-

lates rapid root development and thus promotes good root-soil contact, which can help alleviate seedling water stress. The optimal soil temperature ranges for root growth of boreal spruce and pine species are approximately 20-25 and 25-30°C, respectively.

Low soil temperature at the soil surface increases the risk of frost damage occurring to aerial tissues and is associated with frost heaving, a major cause of seedling mortality. Air temperatures of approximately -3°C during the growing season will result in frost damage to foliage or succulent stem tissue.

Solar radiation has the greatest influence of all factors on soil temperature. The amount of solar radiation absorbed by the soil is affected by the albedo (reflectance) of the surface material (i.e., a dark surface absorbs more energy) and by the amount of light intercepted by a surface layer such as vegetation or a mulch (e.g., organic material or dry, coarse sand).

High soil surface temperatures under boreal conditions are most common near seedlings and young plants, whose succulent stems are in contact with an exposed and highly insulated surface soil of low heat conductivity that can warm, such as dry coarse sand or duff. Seedlings are at risk of damage from high temperatures primarily in a zone about 1 cm above and below ground level.

Soil temperatures are determined by weather (macroclimate), in the form of solar radiation and precipitation (soil moisture content), and site characteristics; site affects soil temperature through its location (slope and aspect), ground cover (vegetation and duff), and the physical properties of the soil (soil texture and moisture).

Heat storage, heat transfer, and temperature within the soil profile are determined by the thermal conductivity and volumetric heat capacity of the soil (both increase as the soil water content increases). Consequently, wetter soils (fine textured soils are often wetter than coarse soils) warm more slowly and are generally colder than drier soils in the same area. Coarse-textured soils tend to

...continued on next page

  
**DEAKIN**  
**EQUIPMENT**  
www.deakin.com

25th  
*Anniversary*

FOR THE PRODUCTS  
AND SERVICE  
YOU DEPEND ON

**RANGER**

CAMP TENTS & EQUIPMENT

**BEAR GUARD**

BEAR DETERRENT PEPPER SPRAY

BEAR SPRAY & FIRST AID

**STONEBLAZE**

PLANTING & FIRE FIGHTING  
EQUIPMENT

**PIONEER**

WATERPROOF RAINGEAR

CALL FOR A FREE  
1996 CATALOGUE

1-800-663-3735



*...continued from previous page*

create a surface mulch more readily than do fine-textured soils. Thermal diffusivity is an index of how readily changes in surface temperature are transmitted deeper into the soil profile. Temperature changes are transmitted slowly through very dry or very wet soils.

### ***Positive effects of site preparation on soil temperature***

Two major goals of mechanical site preparation are to facilitate soil warming in the rooting zone and to reduce surface temperature extremes, which, in turn, can cause seedling heat or cold stresses. Increasing soil temperature can be achieved in the following ways:

**Remove the vegetation that shades the soil or reduce the thickness of the insulating organic layer.** This will cause soil warming as a result of increased solar radiation and thermal diffusivity. Soil warming will be greatest where the original organic layers were thickest.

**Cultivate the soil (e.g., roto-tilling).** This can promote soil warming by reducing soil bulk density and thus improving drainage and aeration.

**Manipulate microtopography through site preparation to favour microsites with a southerly aspect.** The importance of aspect is more profound at higher latitudes, where a surface with a slope of 1° to the south is equivalent, in terms of insulation received, to level ground 100 km farther south.

Drain microsites (e.g., by mounding or plowing), which has proven effective in raising the soil temperature in the rooting zone over that of scalped patches or furrows where low soil temperature is the result of high soil moisture content. This may be particularly true at higher latitudes.

Surface temperature extremes can be decreased by:

Removing the surface organic layer. Exposed mineral soil will maintain lower

## ***...partial removal of the organic layer may result in desirable soil warming...***

surface temperatures because heat is quickly conducted away from the surface. Heat conductance is further enhanced by soil moisture, which increases thermal conductivity and causes cooling through evaporation. The net result is to reduce temperature extremes. Additional protection from excessive insulation can be achieved with a roughened mineral soil surface as was demonstrated in a trial. In that trial, conducted in the Great Lakes states, disking increased the amount of shade, and consequently, the survival of red pine seedlings.

Leaving the insulating surface organic layer intact. This can inhibit frost heaving in susceptible soils. In such cases, partial removal of the organic layer may result in desirable soil warming while still providing protection from frost heaving.

**Partially removing or manipulating the vegetative overstory.** This will reduce the amount of shortwave radiation received by the soil surface. Redistributing logging debris to provide partial shade to microsites will accomplish the same objective.

**Mixing the organic horizons deeply into the mineral soil in coarse-textured soils.** This may avoid the usual extremes of soil surface temperature and moisture that are characteristic of the undisturbed organic layer. However, subsequent compaction to decrease the soil airspace that results from mixing may be required to increase thermal conductivity and volumetric heat capacity, and thus reduce temperature extremes.

### ***Negative effects of site preparation on soil temperature***

As with soil moisture, site preparation treatments aimed at ameliorating soil temperature constraints to seed germination and seedling growth may produce unwanted results if some factors are not considered. Some negative impacts are as follows:

Differences between day and night temperatures may increase. In Sweden, the site preparation method that gives the highest soil temperatures during the day

## **THE PROFESSIONALS IN FIRST AID**

**ALL WCB FIRST AID PROGRAMS\*  
new regulations 1994**

**Tel: 604-662-7740**

## ***TRAUMA TECH***

**ALL WCB FIRST AID EQUIPMENT  
REQUIREMENTS**

*\*including transportation endorsements*

**208-1110 Hamilton St. - Vancouver - BC**

**Fax: 604-662-7746**



also results in the greatest differences between day and night temperatures. If the temperature periodically falls below freezing during the growing season, frost damage is possible. A microsite that warms up earlier in the season, as could be the case for a mounded site, may prompt earlier flushing of seedlings, which could then be susceptible to frost damage.

A droughty, nutrient-impooverished microsite could be created by removal of the organic layers on coarse-textured soils, such as sands. This may negate any improvements gained by increasing soil temperature.

The problem of high soil surface temperatures may be made worse by soil cultivation that loosens the soil structure and increases air content (e.g., mixing), thus lowering the volumetric heat capacity and/or heat conductivity of the surface layer. This can reduce the suitability of a seedbed.

Despite the potentially negative effects described above, the positive effects of exposing mineral soil (raising soil temperature and removing competing vegetation) generally outweigh such drawbacks.

## Nutrient availability

Mineral nutrients obtained from the soil are essential to all metabolic processes in trees. In particular, root growth and development, and consequently, whole plant growth and development from germination onwards, are strongly influenced by soil fertility. Nitrogen, phosphorus, and carbon are particularly important elements. Rapid early growth of a seedling requires that considerable nitrogen resources, other than what is stored in the plant, be quickly found, absorbed, assimilated, and transported to areas in need. Confounding this high nitrogen requirement for establishing seedlings is the need to conserve the site's nutrient pool for long-term stand productivity.

Many boreal forest stands occur on soils that are low in mineral nutrients; the most fertile zones are the surface organic layer and the first 10-20cm of

mineral soil. Nutrient capital and availability are affected by the following:

**Soil texture.** In coarse-textured sands, for example, the nutrient capital can be limited to the organic layer, whereas soils with finer material tend to have a higher nutrient capital in the mineral horizons. Soils with a low nutrient capital include extremely shallow soils, coarse-textured soils that are excessively drained, and soils low in organic matter.

**Form of humus.** This gives an indication of nutrient availability. "Moder" and "Mull" forms of humus indicate greater availability than a "Mor" form. In north-western Ontario, the less fertile Mor humus (and more specifically, fibrimors and humifibrimors) predominates.

**Relative amounts of mineral soil and organic matter.** Nutrients stored in an organic form in the humus layer and in logging debris are returned to the soil after decomposing into a form usable to plants via mineralization processes. Nitrogen, in particular, tends to occur in a less available organic form and, as a result, is often the most limiting of mineral nutrients. Highly humified organic materials consisting of buried leaves, wood, bark, and partially humified forest-floor material play an important role in the regulation of nutrient cycling. This finely divided organic matter favours several positive soil processes—namely, soil aggregation, waterholding capacity, aeration, cation exchange capacity, and nutrient conservation—and can increase the soil's ability to retain nutrients.

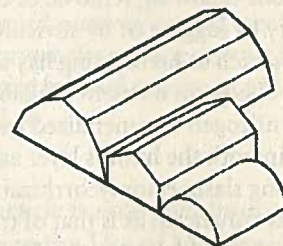
**Plants and soil organisms.** Neighbouring vegetation can influence nutrient availability directly by competing for soil nutrients and indirectly by influencing soil moisture and temperature. Some nitrogen-fixing plants such as alder can supply nitrogen to black spruce. The activity of earthworms, decay fungi, and other microorganisms is essential for soil fertility. In particular, mycorrhizal fungi have a symbiotic relationship with tree roots and can enhance nitrogen and phosphorus uptake, particularly in low-phosphate soils.

...continued on next page

# Project Shelter

International

Division of Rocky Mountain Industrial Fabrics Inc.



## PORTABLE HABITAT SPECIALISTS

### T E N T S

Sleeping

Showers

Dining

Serving

Office

Privy's

Storage

Lightweight

Custom

**Rocky Mountain  
Industrial Fabrics Inc.**

6894 Palm Avenue  
Burnaby, B.C.  
Canada V5J 4M3

Telephone (604) 451-8510  
Out of town 1-800-700-9778

Fax (604) 451-8492  
Out of town 1-800-700-9767



...continued from previous page

**Microclimatic factors.** Low soil temperatures beneath the insulating forest floor typify undisturbed boreal forest sites; as a result, nitrogen is mineralized slowly and thus accumulates as a reservoir in an organic form. Warming of the forest floor following removal of the overstory by logging or by silvicultural practices such as herbiciding has several positive effects on nutrient availability: organic nitrogen is mineralized more rapidly in both the humus layer and decomposing slash; ectomycorrhizal fungi growth is enhanced, as is that of tree roots, both of which increase the area of root-soil contact and thus the absorption of water and nutrients; and warmer soil temperatures lower the viscosity of water and improve its ability to move and supply nutrients between root cells. Increasing light intensity improves a plant's nutritional status through increased photosynthesis.

### ***Positive effects of site preparation on nutrient availability***

A primary objective of mechanical site preparation is to strike a balance between enhancing short-term nutrient availability of seedlings and preserving the longer-term nutrient capital of the site. Nutrient availability can be enhanced with the following techniques:

**Removing or reducing the insulating effect of the organic layer.** Mixing, inverting and trenching, for example, all enhance soil warming and, consequently, nutrient mineralization. Results from studies in Sweden and Finland show that the mineralization of nitrogen, potassium and phosphorus is increased for at least three years after site preparation (mineral mounds on humus) on sandy soils. Warming the soil also promotes tree root growth, which allows roots to quickly reach the more fertile undisturbed organic material nearby. This assumes that the cleared areas are relatively small.

**Mixing the organic surface layer with the underlying mineral soil.** Mixing may further enhance nutrient availability in soils of low fertility by encouraging the spread

of mycorrhizae into the mineral soil. (The effects of site preparation on mycorrhizal fungi need to be better defined by researchers.) Cultivation can also improve aeration and assist microbial activity in soils that either suffer from compaction or have impenetrable layers.

**Raising and cultivating (loosening) the soil.** Bedding, for example, as practiced in the southern United States, can enhance nutrient uptake for many years in soils that suffer from poor water movement and aeration.

## ***...cultivation can improve aeration and assist microbial activity in soils...***

**Reducing competing vegetation on a site.** This serves to reduce one source of competition for soil nutrients and, as a result of increased light, enhances carbon uptake for crop trees.

Mechanical site preparation has an impact on the nutrient reserves of a site, primarily through the displacement or redistribution of the reserves stored in logging debris and in the organic and upper soil layers, and through the increased availability of nutrients as a result of mineralization. Unfortunately, neither newly germinated tree seeds nor planted stock are initially able to use all of the large nutrient reserves made available as a result of site preparation. Consequently, nutrient loss by leaching may result. The following techniques have been employed to preserve the site's nutrient capital:

**Spot scarifying only the small area in which an individual seedling will be planted.** This will minimize losses due to leaching and will also conserve the nutrient reserves in the undisturbed organic layer, in logging debris close to the growing seedling. The incidence of erosion, another source of nutrient loss, is also reduced.

**Mixing or inverting the more fertile surface organic layers and the underly-**

**ing mineral soil, instead of completely removing the organic layer.** This will preserve the longer-term nutrient status of the site and can enhance tree growth. Slowing the mineralization of soil nutrients during the initial years of plantation development, when conifers are small and understory vegetation is sparse, may preserve these nutrients until crop trees are older and better able to exploit available nutrients. Mixing that incorporates the surface organic materials deep into the mineral soil can have a moderating effect on the rate of mineralization of nutrients by avoiding the temperature extremes commonly observed on the exposed surface organic layers. Buried wood and bark can also conserve soil fertility, as the microbial activity that accompanies their decomposition can temporarily immobilize nutrients.

**Reducing the depth of removal of the organic and mineral soil horizons.** This will help conserve nutrients, which can be particularly important when the subsoil is infertile.

### ***Negative effects of site preparation on nutrient availability***

In terms of overall net losses of site productivity, the negative consequences of mechanical site preparation have not been well defined for boreal forest conditions. In summarizing soil treatment guidelines, one researcher has suggested, "Do as much as necessary but as little as possible." However, experience from other regions or countries may provide general guidelines that are applicable to the boreal forest.

Researchers in Sweden have recommended that "harsh" site preparation methods (continuous disc trenching or tilt plowing) be avoided on poor site types with thin humus layers, dry or coarse textured soils, in favour of milder treatments such as mounding, or mounding and ditching.

Other studies are less definitive; results from the southern United States suggest that on sites low in organic matter, and where large (nitrogen) deficiencies oc-



cur, nitrogen availability and plantation productivity may eventually be reduced by treatments that remove or displace large amounts of nitrogen.

On the basis of results from past studies on seedling growth following mechanical site preparation in British Columbia, windrowing appears to result in the most consistent reduction of tree growth, compared with less severe forms of mechanical disturbance. After summarizing the effects of various forms of mechanical site preparation on vegetation and the growth of spruce in north-central British Columbia, this study concluded that although blade scarification reduced competing vegetation, it also decreased spruce performance for up to 13 years following treatment. Another study found that scalping of the forest floor temporarily eliminated the mycorrhizae-forming fungi and resulted in short-term deficiencies in phosphorus uptake.

In Ontario, there are examples of how duff removal on infertile sites before planting has a negative effect on tree growth after 8 and 19 years, respectively. Incorporating duff and fine woody debris into mineral soil by mixing, for example, may not be an adequate sink for nutrients released immediately after mixing. This implies that long-term growth may be reduced by mixing.

With much of northwestern Ontario dominated by low fertility soils, many of which are also shallow and coarse-textured, special care must be exercised in prescribing and executing mechanical site preparation. The question of which site preparation methods are harsh or detrimental can be considered within the context of soil and site fertility and the relative degree of disturbance, as depicted by the mechanical microsite categories.

Extremely shallow soils have a limited store of nutrients and are sensitive to disturbance, as are coarse-textured, ex-

cessively well drained soils, whose limited nutrient reserves reside principally in the surface organic layer and in logging debris. Any treatment of such sites should retain as much of the organic layer and any logging debris as possible, or mix the organic and mineral soil layers together. Conversely, in deeper, fine-textured soils with a greater or better-distributed nutrient capital, treatments that remove the surface organic layer and some mineral soil are not as detrimental. ♦

*This article is excerpted from the Guide to the Use of Mechanical Site Preparation Equipment in Northwestern Ontario, which was published with funding from the Ontario FRDA in 1995. Copies of the full report can be obtained from the Canadian Forest Service, Box 490, Sault Ste. Marie, Ontario, P6A 5M7.*



## Seedling Transport

*Improving reforestation  
quality while reducing costs.*



## RENTALS AVAILABLE

Horizon Fiberglass Products toll-free: 1-800-887-6288  
3551 River Road West tel (604) 946-0033  
Delta, BC, Canada V4K 3N2 fax (604) 946-0522

## FAMOUS FOODS

### THE ORIGINAL NATURAL FOOD STORE

Herbs and Spices

Assorted Teas

Baking Supplies

Pasta

Assorted Cheeses

Nuts & Grains

Deli Meats

Dry Fruits & Vegetables

1595 Kingsway (at King Edward Ave)  
Vancouver, BC

872-3019



ASK FOR THE SILVICULTURE DISCOUNT



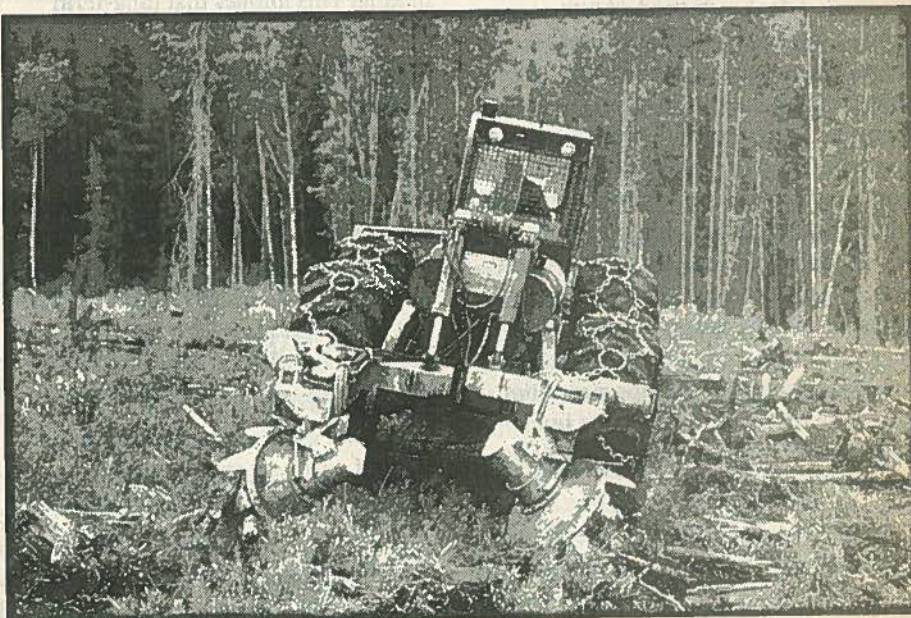
# New expectations change site preparation in BC's Interior

Alan Waters, RPF

**S**ilviculture practice in British Columbia is changing under the Forest Practices Code. These changes are primarily in response to a shift from a focus on timber production to one that emphasizes biodiversity, riparian management for fish and wildlife values, and the maintenance of visual quality and other resource values. Government policy has affected site preparation in at least two ways: first, with the trend away from broadcast burning, and second, with compliance with soil conservation provisions outlined in the code.

Broadcast burning is one site preparation technique seriously curtailed by government policy. Table 1 presents a summary by forest region of the total number of hectares broadcast burned in BC in the last 15 years. Between 1981 and 1991 an average of 40,000 hectares were burned per year in the province, in contrast to an average of only 7,400 hectares in the last two years.

Many forest companies have abandoned the use of broadcast burning due to re-



*Disk trencher at work in northern BC.*

duced cutblock sizes, irregular cutblock boundaries, the use of silvicultural systems other than clearcutting, riparian management requirements, wildlife tree or patch retention, smoke management policy, the financial liability for fire es-

capas, and negative public pressure. Most silviculture foresters agree that broadcast burning was a highly effective method for reducing initial vegetation competition and improving planter access on some of the most productive

## SAVANNAH

IS SYNONYMOUS WITH

## REFORESTATION

We build over 30 types of forestry plows for use in all types of second rotation forestry sites. Coming soon our soon-to-be-released very tough rotary spot cultivator for mounting on a 20 ton excavator.

Contact:

Savannah Forestry Equipment Inc.  
PO Box 8606, Savannah, GA, 31412 USA  
Phone: 1.800.240.8358 Fax: 912.966.5984



spruce-balsam forests in the sub-boreal spruce, Interior cedar-hemlock and lower elevations of the Engelmann spruce-subalpine fir zones. High costs and the inability to carry out this treatment has compelled many forest companies to turn to mechanical site preparation as a cost-effective and reliable alternative.

For broadcast burning to be implemented in a cost-effective manner, cutblocks must have regular boundaries that present a minimal likelihood of fire escape. The larger the cutblock size and

the shorter the perimeter, the easier it is to achieve a reasonable burning cost per hectare. In the past, cutblock boundary designs used larger wetlands as windfirm boundaries favourable for broadcast burning. Many wetlands now require the preservation of a timber reserve or the creation of a riparian management zone where the understory vegetation is maintained for wildlife. These riparian areas, which must be fire guarded, greatly increase the risk of escape and usually encourage a decision to use mechanical site preparation as a less risky alternative.

Catastrophic wildfires have played a natural role in the development of these forests over the centuries. The current trend, which seems to be eliminating the occurrence of fire, needs to be carefully scrutinized. On appropriate sites, the tremendous benefits of initial vegetation control and improved seedling performance from broadcast burning must be carefully weighed against objectives for wildlife management.

With the decline in broadcast burning, the piling for logging slash or the preparation of individual planting spots with

...continued on next page

**TABLE 1: Summary of hectares broadcast burned by region**

Year	Cariboo	Kamloops	Nelson	P. George	P. Rupert	Vancouver	TOTAL
81/82	1,528	1,837	419	8,799	2,596	1,757	16,936
82/83	3,806	2,187	781	11,115	4,515	2,874	25,278
83/84	3,500	5,649	1,841	7,304	6,029	6,002	30,325
84/85	3,727	4,769	2,880	13,092	4,937	6,705	36,110
85/86	1,641	2,729	2,424	23,499	8,691	3,655	42,639
86/87	8,324	10,200	5,837	21,256	4,209	5,752	55,578
87/88	5,546	4,454	6,897	40,371	8,894	5,339	71,501
88/89	10,844	7,334	7,979	14,886	10,341	3,539	54,923
89/90	5,905	7,822	4,811	14,599	9,787	2,097	45,021
90/91	4,632	2,148	1,970	11,391	3,788	1,264	25,193
91/92	4,560	4,435	3,936	8,462	4,413	1,514	27,320
92/93	3,118	1,676	2,287	1,279	562	906	9,828
93/94	5,103	3,498	3,782	11,103	2,639	797	26,922
94/95	2,583	1,096	1,992	1,037	260	489	7,457
95/96	2,506	493	2,196	1,625	401	44	7,265
<b>TOTALS</b>	<b>67,323</b>	<b>60,327</b>	<b>50,032</b>	<b>189,818</b>	<b>72,062</b>	<b>42,734</b>	<b>482,296</b>
<b>81-91 AVG.</b>	<b>4,945</b>	<b>4,913</b>	<b>3,584</b>	<b>16,631</b>	<b>6,379</b>	<b>3,898</b>	<b>40,350</b>
<b>94-96 AVG.</b>	<b>2,545</b>	<b>795</b>	<b>2,094</b>	<b>1,331</b>	<b>331</b>	<b>267</b>	<b>7,361</b>

Source: BC Ministry of Forests Integrated Silviculture Information System

**HOT WATER  
INSTANTLY!**

**Portable  
Lightweight  
Economical  
Fast**

**Paloma  
Water Heater**



**Contact**

**Astravan Distributors Ltd.  
1-800-663-8405**

**TOTAL ACCESS RENTALS**



### Nodwell ATV Rentals

- site preparation
- tree planting
- road development
- remote camp servicing

Dual brake system, air disc brakes, diesel power c/w auto transmission, fuel efficient and reliable. Available with qualified drivers.

**Tel: 604-564-0383 Fax: 604-562-4885**



**TABLE 2: Recommended maximum allowable proportion of the net area to be reforested that can be occupied by soil disturbance and forest floor displacement in the BC Interior**

	Sensitivity	Max. allowable forest soil floor disturbance	Max. allowable displacement
Mass wasting <sup>b</sup>	VH	5	5
Soil displacement	VH	5	15
Surface soil erosion	VH	5	15
Mass wasting	H	5	25
Soil compaction	VH	5	25
Surface soil erosion	H	10	25
Mass wasting	M, L	10	30
Soil displacement	H, M, L	10	30
Surface soil erosion	M, L	10	30
Soil compaction	H, M, L	10	30
Forest floor displacement	VH, H, M, L	10	30

<sup>a</sup> VH = Very High ; H = High ; M = Moderate ; L = Low

<sup>b</sup> Mass wasting hazard refers to the potential for cut and fill failures, and should not be confused with terrain stability, which refers to the likelihood of landslides.

...continued from previous page

excavators and disc trenching have taken over as the dominant forms of site preparation. To ensure harvesting and site preparation do not have negative impacts on forest soil, the Forest Practices Code's soil conservation provisions require silviculture prescriptions to place limits on soil disturbance and forest floor displacement in areas where reforestation will take place.

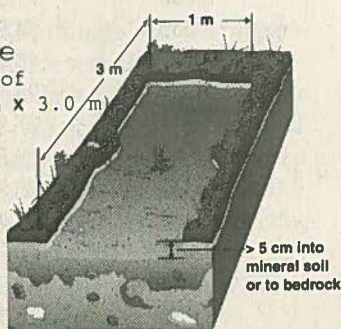
### Soil disturbances and mechanical site preparation

The twelve categories of soil disturbance recognized under the code are illustrated in Figure 1. Seven of the categories count on all sites, while the remaining five count on sites with higher soil sensitivity ratings.

## Always Counted

### Long Gouge

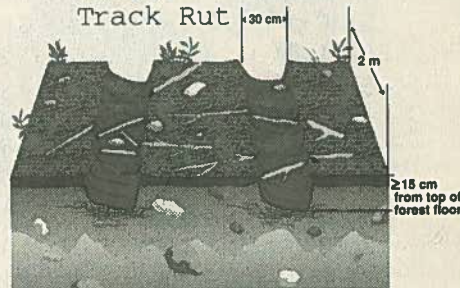
(100% of 1.0 m x 3.0 m)



### Deep Gouge



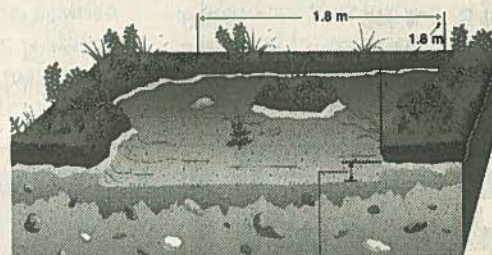
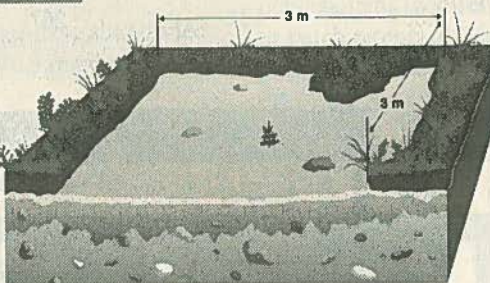
### Wheel/Track Rut



### Very Wide Scalp\*

(80% of 3.0 m x 3.0 m)

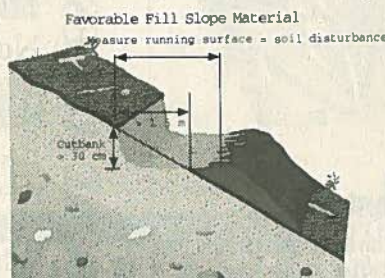
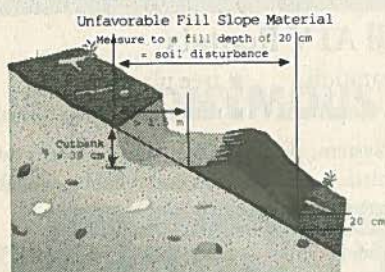
\* Scalp means the forest floor has been removed.



### Wide Gouge

(80% of 1.8 m x 1.8 m)

### Temporary Excavated/Bladed Trails



**Corduroy Trail:** logs and woody debris placed side-by-side to form a surface > 2 m long capable of supporting machine traffic.

Figure 1. Categories of soil disturbance under the Forest Practices Code.



The soil disturbance categories cover items such as scalps and gouges, which remove the fertile and protective forest floor and top soil; ruts from equipment wheels or tracks; soil compaction; and the creation of excavated, bladed or corduroyed trails. To count as soil disturbance, each category has minimum dimensions that must be met or exceeded. Smaller scalps or gouges, for instance, which do not meet the minimum dimensions are not counted as soil disturbance. These smaller disturbances may, however, be counted towards the maximum forest floor displacement. Forest floor displacement assesses the proportion of the area where the surface organic matter has

been effectively removed, exposing mineral soil. This is a new prescription requirement, which was instituted with the Forest Practices Code.

In the preparation of silviculture prescriptions, the soil is rated as low, moderate, high or very high for the following hazards using standardized procedures:

- soil compaction;
- soil displacement;
- surface soil erosion;
- mass wasting; and
- forest floor displacement.

Each cutblock is carefully stratified into similar units based on topography, ecological site series and soil type. The soil hazard ratings are based on soil

moisture regime, humus form and depth, soil texture, coarse fragment content, and the depth to unfavourable substrate (such as hardpan, gravel, bedrock or seepage water). The steepness of the slope and the presence of gullies or hummocky terrain are also taken into consideration.

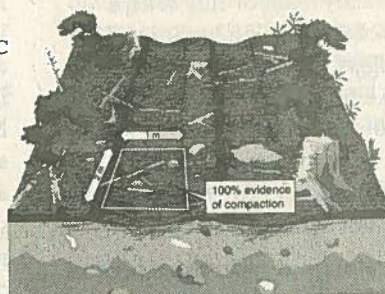
Once the soil hazards have been assessed, reference is made to the soil conservation guidebook, which suggests what the maximum limits should be for soil disturbance and forest floor displacement. Based on the soil hazards, the guidebook suggests soil disturbance should not exceed 5% to 10% of the net area to be reforested. Maximum limits for forest floor displacement range between 5% and 30%. Table 2 illustrates the maximum limits for soil disturbance and forest floor displacement. The maximum limits for soil disturbance and forest floor displacement are set at the lowest limit required by any of the soil hazards for that particular area. For instance, if clay soils resulted in a very high soil compaction hazard and all other soil hazards were rated as moderate, the maximum soil disturbance and forest floor displacement should be set at 5% and 25% respectively. The maximum values presented in the guidebook are recommendations that may be increased on a site-specific basis with justification. If stump removal for root rot control was required, the maximum limits could be increased, provided the treatment will not result in surface soil erosion, impairment of water quality or other negative impacts.

The maximum suggested limits for soil disturbance and forest floor displacement, and the size and shape of each category of soil disturbance have been carefully set so that beneficial forms of mechanical site preparation can still be executed without exceeding the stated limits. Site preparation contractors must be aware of the maximum limits for soil disturbance and forest floor displacement for the areas they undertake work on. These limits are approved on the silviculture prescription, which forms the legal contract for evaluation of compliance. Different limits may ap-

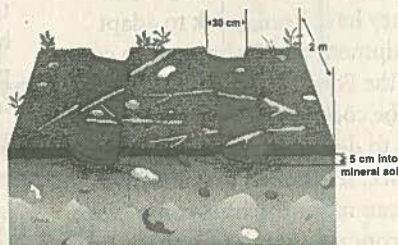
## Sometimes Counted

Repeated Machine Traffic  
Counted on: **Very High, High and Moderate Compaction Hazard Sites**

**Compacted Areas\***: counted on same sites as "repeated machine traffic," illustrated above, but compacted areas are larger (i.e., must be >100 m<sup>2</sup> and >5 m wide) with 100% evidence of compaction.

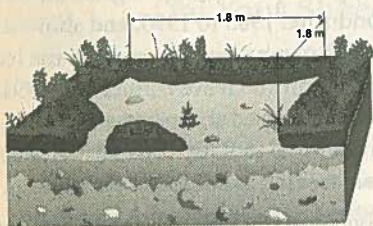


Wheel/Track Rut  
Counted on: **Very High and High Compaction Hazard Sites**



Wide Scalp  
(80% of 1.8 m x 1.8 m)

Counted when: H or VH, mass wasting or forest floor displacement; or VH soil displacement, compaction or erosion; or moderate or high likelihood of landslides.



**Continuous Scalp**

Counted when: H or VH, mass wasting or erosion; or VH soil displacement; or moderate to high likelihood of landslides.

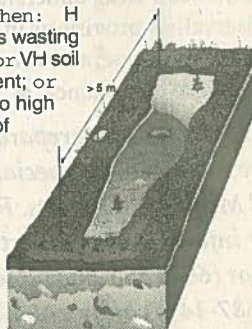


Figure 1. (continued).

...continued on next page



# Sheep browsing for silviculture gets study

Joyce Murray

**A**fter a lengthy process, Forest Renewal BC has approved a WSCA proposal for a \$69,000 one-year study of sheep browsing as a silvicultural tool in BC. The study will synthesize research and field experience of sheep browsing in BC's forest regions in order to understand problems and educate stakeholders. As well, the study will identify key issues related to industry decline and develop recommendations for use of sheep in silviculture. The project is intended to improve forest industry understanding of sheep browsing,

and provide greater access to browsing where it can best meet silviculture treatment requirements.

The project was prompted in part by a recent dramatic decline in silvicultural sheep browsing in BC. The market fell from 40,000 sheep grazed in 1994 to 32,000 in 1995, and to an anticipated 15,000 for 1996. (The 1996 decline was not as significant as projected — see update at the end of the article.)

There is little information or agreement, and much speculation, as to why demand is plummeting. Is it due to serious in-

efficiencies with this silvicultural tool? Does it reflect the normal growing pains of a new forest management practice? Or is this a side effect of other forestry initiatives? People with a stake in silvicultural sheep browsing want to know what is going on. Recently, the Ministry of Forests Silviculture Branch initiated collecting from district offices all research results and reports pertaining to sheep browsing. Unfortunately, MOF does not have the budget and personnel to synthesize and analyze this data. The uncertain future of silvicultural sheep browsing means BC risks losing what many feel is a beneficial integrated forest management practice. Sheep need to eat, so the sheep-browsing industry is not one that can be put on hold for long without being harmed.

Sheep browsing is an emerging forest management practice. Leafy vegetation abounds in many young forest plantations, and by competing for light and nutrients, slows or prevents the growth of the commercial conifer seedlings. Until 1985, plantation vegetation was managed either by herbicide application or by manual brush control treatments. Trials using sheep to manage vegetation were conducted 1985 to 1990, and showed that in many cases, sheep graze the leafy vegetation and leave conifers. In 1991, MOF approved sheep browsing as a silvicultural tool. By 1993 40,000 sheep were feeding in BC forest plantations.

Silviculturally effective sheep browsing has spin-off benefits. The lower average

...continued from previous page

ply to separate strata within a cutblock. For example, relatively dry sites where disc trenching is proposed may have limits of 10% for soil disturbance and 30% for forest floor displacement. Wet sites on the same cutblock where excavator mounding is proposed would typically have limits of 5% for soil disturbance and 25% for forest floor displacement.

Knowing the limits for each treatment area is important, but equally important is an understanding of which categories of soil disturbance count for the area. To assist mechanical site-preparation operators and supervisors, plastic field cards illustrating the dimensions of each category of soil disturbance have been prepared and distributed at training sessions throughout the province.

Once operators are aware of the dimensions of each category, they can ensure the minimization of soil disturbance. Traditional forms of site preparation, such as excavator mounding on wet sites, can be performed without causing significant soil disturbance, provided the excavations are less than 30 cm deep into mineral soil and not large enough to qualify as any of the scalps or gouges. In addition, the tracks of the machine must be sufficiently wide to prevent counted ruts or soil compaction.

Disc trenching, traditionally carried out

on gently rolling terrain, results in very low levels of counted disturbance unless the continuous scalp category of soil disturbance counts. On steeper slopes with fine sandy loam or silty soils, a high surface soil erosion hazard will usually trigger the continuous scalp category. On sites with serious surface soil erosion potential, disc trenching must be intermittent in pattern so that trenches greater than five metres in length are not created.

Once operators and supervisors become aware of what constitutes soil disturbance, they have been quick to adapt their equipment and techniques to comply with the Forest Practices Code. Although the code provides for substantial penalties to deal with situations of non-compliance, it is hoped that effective training can minimize non-compliance. There is concern that the emphasis on penalties has caused some forest companies to back away from site preparation. However, once a clear understanding of soil conservation provisions in the code is obtained, most operators are readily able to achieve compliance. ♦

*Alan Waters is a site preparation and fire management specialist with the BC Ministry of Forests. For further information, contact him by phone at (604) 356-6041; by fax at (604) 387-1467; or by e-mail at [alwaters@mfor01.for.gov.bc.ca](mailto:alwaters@mfor01.for.gov.bc.ca).*



cost of managing plantations, compared with manual brushing, saves MOF and the forest industry money. "Free" food for the herd increases the competitiveness of the lamb and wool producers. The stringent health requirements for browsing sheep in plantations have resulted in a better average health-level for sheep in BC. Compared with pre-plant site preparation methods that disturb topsoil, browsing conserves and improves soil quality. Sheep browsing broadens the range of brushing options, particularly useful in areas where public concern makes herbicide use problematic. Finally, rural farming and small business jobs are created and communities strengthened by using sheep when compared with herbicides. This benefit to the community is an indirect or external benefit not factored into vegetation-management cost comparisons. However, it strengthens the rationale for government to support analysis and extension initiatives that address threats to the silvicultural sheep-browsing industry.

However, constraints to successful sheep browsing limit this tool from being used in certain sites and situations. The possibility that shepherds will kill sheep predators such as wolves and grizzly bears has caused concern, as does the potential for disease transference into wildlife populations. Fine-textured soils and riparian areas are off-limits to sheep, and steep slopes and heavy slash cannot be browsed cost-effectively. Animal neglect, seedling damage and soil degradation can result from herder inexperience or errors. Moving, watering and herding large flocks effectively requires large cutblocks as well as good stock selection, planning and logistics. From the silviculture forester's perspective, the comparative complexities of planning and administering sheep browsing limit use.

Despite the constraints, this new forest management practice has generated strong support and ongoing cross-sector cooperation. Key people from several ministries, forest regions and stockholder groups have worked together to

achieve the benefits of silvicultural sheep browsing, and to identify, address and prevent problems. The BC Inter-ministry Committee for the Use of Domestic Sheep for Vegetation Management and their management guidelines exemplify the level of commitment.

If the trend towards a dramatic decline in silvicultural sheep browsing in BC continues, this segment of the forest industry will soon be marginal or non-existent. Contractors and farmers who have invested in sheep browse capability have idle resources, and are unsure of how to plan for the future. Researchers who have seen the industry's past successes are unsure why foresters are rejecting the sheep option. Personnel from the various ministries who have worked to build this industry see the results of their efforts dissipating. Rumours of the industry's problems may cause foresters to be unwilling to try out sheep browsing on their sites.

*...continued on next page*



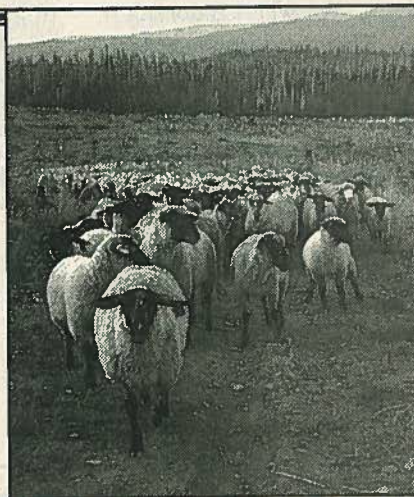
## CANADIAN COOPERATIVE WOOL GROWERS LTD.

Proud Suppliers of  
Stockmans Supplies to  
the Clear Cut Grazing  
Projects

◆  
All Your Sheep and  
Lambing Supplies

◆  
Ask For Our Free Catalogue

918 1st Avenue South, Lethbridge, AB T1J 0A9  
Ph: 403-327-3760 Fax: 403-380-6982  
Order Desk: 1-800-567-3693



## LOXTON SHEEP COMPANY

*"Get It Right the First Time"*

**Lots of Silviculture Experience  
– Lots of Sheep**

RR#2, S-11, C-9, Prince George, BC V2N 2H9  
☎ (250) 971-2204



...continued from previous page

One theory explains this decline as temporary: given new workloads related to the Forest Practices Code and FRBC applications, foresters are too overloaded this year to undertake learning a new silvicultural tool, one that they have not been exposed to during forestry training. Other theories conclude that examples of poor contractor or shepherd performance have tainted the industry; that inadequate administrative planning has undermined the potential effectiveness of browsing; that browsing is simply not cost-competitive given the new regulatory complexities in forest management; or that forestry communities are becoming more tolerant of chemical vegetation management, which appears to cost less than sheep.

Effective problem analysis and recommendations for action will stabilize the sheep browsing industry. Farmers and contractors need information to be able to plan— either to leave the industry, to hold on, or to promote their service and expand. Foresters need to know where sheep browsing works, where it doesn't work, and why. They need resources to help with the operational and administrative learning curves. The potential benefits of silvicultural sheep browsing justify a coordinated support effort. ♦

*This article is based on the FRBC Sheep Browse Study proposal written for the WSCA by Joyce Murray.*



*Shepherd Norleen Shepard shepherds a sheepish multitude near Stewart, BC.*

### *1996 season update*

The most dire predictions of a 50% reduction in sheep browsing did not materialise — apparently a number of contracts were let just as the season started. About 24,000 of the woolly critters were out munching on BC's clearcuts — a 25% decline from 1995. Enough to allow most grazing contractors to just hang in there. From the government perspective, both Lorne Bedford of MOF and Dr. Lang of Ministry of Agriculture declared it a successful year. Thanks to the shepherds' vigilance, bear predation was minimal despite the large number of bears present in the woods this year.

## **SALES - SERVICES - RENTALS**



**Your  
Communications  
Specialists**

**BK**  
TWO-WAY RADIO LTD.

**KENWOOD**

**Standard**  
Communications

**MOTOROLA**

**RADIO RENTALS - Hand-helds and Mobiles**

**PRINCE GEORGE**  
3641 - 15th Avenue  
Prince George, BC, V2N 1A3  
TEL: 604-562-4856  
FAX: 604-562-0020

**QUESNEL**  
1905 Highway 97  
Quesnel, BC  
V2J 3P2  
TEL: 604-992-9007



# The PR war over Canada's boreal forests

Dirk Brinkman

## Canadian Silviculture Association Canadienne Sylvicole

1005-151 Slater Street  
Ottawa, ON  
K1P 5H3  
tel: (613) 234-2242  
fax: (613) 234-6181

### National Executive

**René Ouellette**

Association des Entrepreneur en  
Travaux Sylvicoles du Québec

**Roland Roy**

New Brunswick Independent  
Silviculturists Association

**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

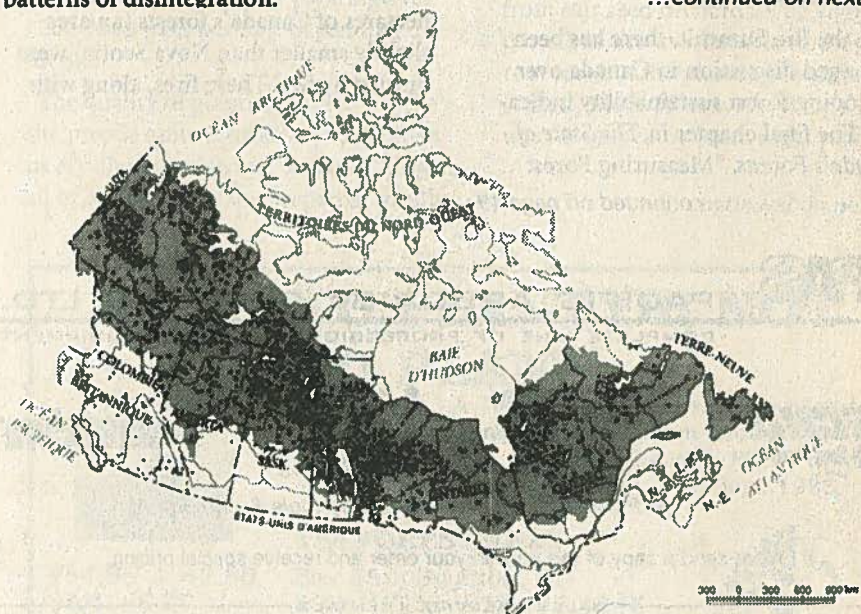
International marketing of forest products is becoming a game of "greener than thou." A number of recent federal publications attempt to address the PR war causing the Canadian forest industry to lose its European market share. For example, Natural Resources Canada and *Canadian Geographic* have recently issued a glossy national atlas of the Canadian boreal forest. This slick publication features photos of historic and dominant features of the ecosystem, and is filled with phrases like "guarding the forest for the future."

The cover note of the atlas proclaims, "Draped like a great green scarf across the shoulders of North America, the boreal or 'northern' forest is Canada's largest ecosystem." In most provinces, however, this boreal scarf is badly fraying from insects, fire, and harvesting without adequate regeneration. Without the FRDAs, there is no federal budget for repairing the fabric, and a threadbare Forestry Canada can only map the patterns of disintegration.

In fact, Natural Resources Canada issuing a map of the whole boreal forest is ironic in itself. Cutbacks in the Canadian Forestry Service have reduced its role to co-managing some Model Forest areas—also known as "toy forests"—that only register as tiny dots on the overall map.

Today, the audience for dull tomes on national forest statistics has expanded from academics and investors to potential consumers. The 1995 status reports, *The State of Canada's Forests*, *Compendium of Canadian Forestry Statistics* and *Forest Regeneration in Canada*, are now available from Natural Resources Canada. They summarize regional silviculture data in graphic and numerical formats (although correlating data between provinces has always been difficult because similar activities are recorded differently). To the discerning green consumer, some of the numbers may not look very attractive.

...continued on next page



Shaded areas indicate boreal forest; black dots represent forest fires covering more than 900 hectares (1980-1989).



...continued from previous page

The reports show that the area harvested annually peaked in 1987 at just over one million hectares, while the area planted annually peaked in 1990 at just over 400 thousand hectares.

In the early '90s, Canada's Not Sufficiently Restocked (NSR) forest land was reported to be over 20 million hectares. This embarrassing figure has been erased by changing the classification to "Understocked: disturbed land that will require silviculture treatment to meet stocking standards." This classification encompasses a much smaller area. The current reports show the understocked area as having increased annually, peaking in 1991 at about 3 million hectares, and declining in 1992 "as a result of expanded silviculture programs." There is no explanation of why the amount of understocked area increased even while the area planted increased.

In the Commercial Forest Area Statistics, the "area not growing commercial species 10 years after harvesting" is recorded as 2.49 million hectares, with a note that annual depletions by fires averaged 1.3 million hectares per year between 1979 and 1993, compared to harvesting depletions of just under a million hectares per year.

Since the Rio Summit, there has been prolonged discussion in Canada over developing forest sustainability indicators. The final chapter in *The State of Canada's Forests*, "Measuring Forest

...continued on page 49

## Canada's carbon sink being drained

Dirk Brinkman

Human activity releases 6.5 billion tonnes of carbon into the atmosphere every year— 4.8 from fossil fuels, and the rest from burning forests. The measured increase in atmospheric carbon is only 2.7 million tonnes, the balance is presumed to be absorbed by plankton in the ocean, and by forests on land. The Northern boreal forest includes 17% of the world's forested surface, and contains 1/6th of the carbon locked up on land. A research project called the BOREAS has been launched to measure if this large living ecosystem is absorbing a significant proportion of the carbon that people are putting into the atmosphere.

One effect of 1995 having been the hottest year on record, is that 7.2 million hectares of Canada's forests (an area slightly smaller than Nova Scotia) were burned by fire. These fires, along with

two other side effects of global warming— increased pest levels and reduced growth from weather changes— may be shifting the boreal forest, which is the

world's largest forest, from being a net carbon sink to being a net contributor of CO<sub>2</sub>.

Any notion of a federal reforestation program to address the problems facing the boreal forest has become a pipe dream. Even the

modest Forest Renewal Trust funds for the Yukon and Northwest Territories may be drained for deficit reduction by the federal government. (Federal freezes on reforestation programs in the Yukon were in place at press time.) Funding for the reforestation of the "understocked" areas in the Northern boreal forest may have to await a "market necessity" in order for major commercial producers of CO<sub>2</sub> to create silviculture sinks offsetting their emissions. ♦

*...these fires...may be shifting the boreal forest from being a net carbon sink to being a net contributor of CO<sub>2</sub>...*

**PAS**

**PACIFIC ARBORIST SUPPLIES LTD.**

COMPLETE LINE OF PROFESSIONAL TOOLS & EQUIPMENT

**ECHO**  
Ask Any Pro!

- Climbing gear
- Ropes & riggings
- Hand Saws
- Power Broom
- Power equipment
- Pruners
- Chainsaws
- Safety tools & equipment

**shindaiwa**

Fax or send a copy of this ad with your order and receive special pricing.

Tel: (604) 929-6133/924-1552  
Fax: (604) 929-4617

SHOWROOM  
154 Riverside Dr., N. Vancouver, BC V7H 1T9

SALES · SERVICE · RENTALS

CANADIAN  
**SILVICULTURE** MAGAZINE

Gotta beef?

Well, drop us a line.

PO Box 65506, Stn F,  
Vancouver, BC V5N 5K5  
or fax (604) 875-1403.



# The root of it all: Swedish reforestation today

Dirk Brinkman

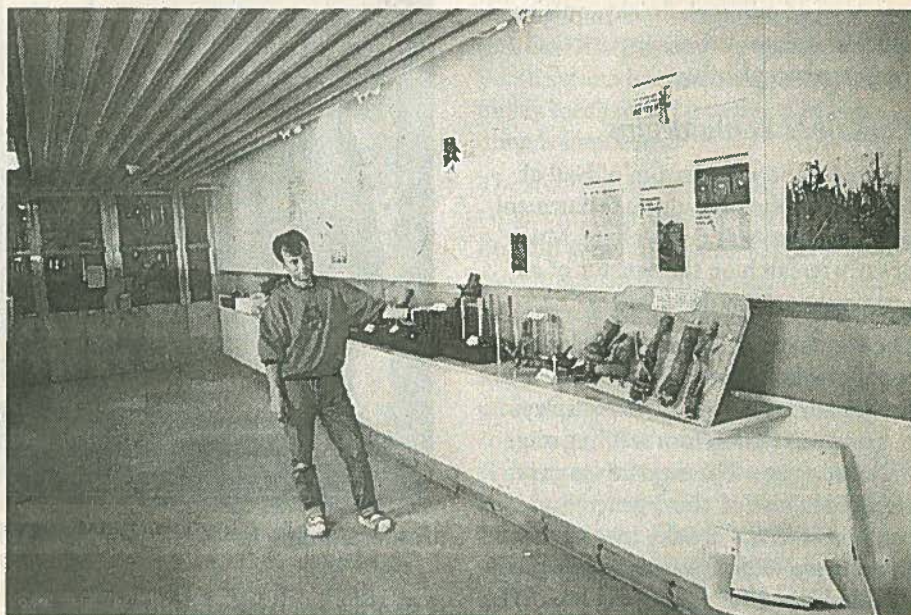
I recently experienced a brief but wonderful visit to Sweden that included a tour of reforestation facilities. This tour gave insights as to the state of silviculture in Sweden today and provided the opportunity to speak with Swedish silviculturalists about their concerns.

Planters in Sweden mostly use the Pottaputki, still, though I also saw some hoedad planting. A long career as a forest worker is made possible by the ergonomics of the Pottaputki (developed in 1948)—no bending down, most microsites machine-prepared, with the work of planting limited to opening a cavity the precise size of the container.

"I have been planting each season for thirty years. The rest of the year I do other forestry work. I expect to plant for many more," one Stora planter told me with obvious pride.

A Pottaputki planter cannot look into the opening and confirm the suitability of the soil in which the seedling is being planted. As I watched the planter work without much apparent regard for the microsite, I speculated that a BC checker would probably consider the planting quality too low to receive payment.

This planter was working for Stora, the world's oldest corporation, having recently celebrated its 700th anniversary.



Anders Lindstrom in his "Hall of Horrors."

Stora Chief Forester Anna Noren said, "We plant about 37 million seedlings on 15,400 hectares per year using both regular local forestry workers, and students hired seasonally. Planters are paid an hourly wage of about \$45 Cnd, plus a production incentive for planting over 1200-1500 trees per day, depending on the site.

"The quality of planting here in Bracke site prep is quite satisfactory. This gives us excellent growth and survival. Almost all of our areas are site prepared, mostly

with the Bracke Moulder (avg. \$260/ha), but some high sites, where brush competition is greater, with the excavator (+\$2000/ha)."

Noren added that "we have improved growth now that we get 95% of our seed from our seed orchards. The vigorous growth is also attributable to the good root form of the planting container [called] Plant System 80 (80 cc's), which was developed by Stora eight years ago."

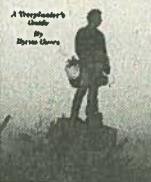
...continued on next page

## CANADIAN SILVICULTURE MAGAZINE

Subscribe to  
Canada's only publication  
dedicated to silviculture.

Call (604) 253-4307  
for details or fax  
your request to  
(604) 875-1403.

To Plant or Not To Plant  
That is the Question



\$14.95 + \$2.50  
S&H + GST  
volume discounts

## TO PLANT OR NOT TO PLANT

Byron Goerz. A Tree Planter's Guide, and a must for every planter. Covers everything from getting a job to learning the basics and making money. Plenty of humorous anecdotes. 6x9, 167p, b&w illus. 1996.

### The FOREST SHOP

Box 550, Brighton, ON  
K0K 1H0 fax 613-475-4646  
toll free 800-668-1345  
(ask for our free catalogue!)





...continued from previous page

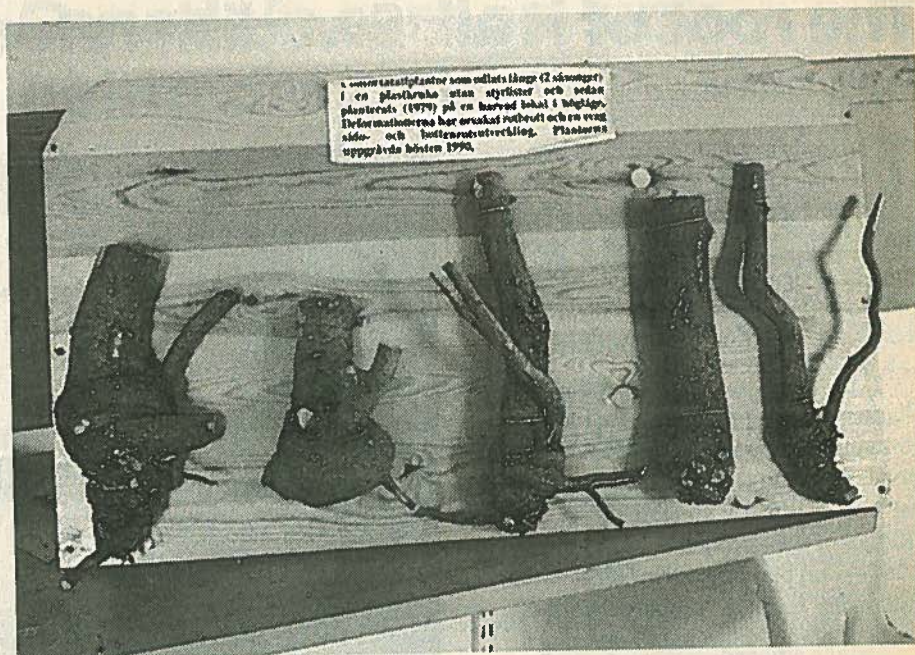
Adjacent plantations testified that the seedlings are growing very well. The low stress of minimal, finicky, quality issues impressed me as supportive of a long career in planting.

## Container conundrums

I visited Anders Lindstrom's "Hall of Horrors" at the silviculture department in the university at Garpenberg. Much of early research on the benefits of air pruning roots was done here.

The effects of the "strangle tangles" of root growth in first- and second-generation Swedish containers were displayed in gruesome detail from seedling stage to thinning age. These examples were alongside those of third-generation containers with a healthy root form. Of these, Stora's Plant System 80 was the first developed.

I also spoke with Lars Ove Sandberg, Chief Forester of AssiDoman, the private forest company in Sweden with the largest land base. He said, "My Board of Directors have charged me to solve one primary problem: select the seedling container system which produces the best root form."



Root "strangle tangles" from the "Hall of Horrors"

His office contained two stacks to the ceiling of samples of air-pruned containers recently developed by various Scandinavian suppliers. "At the moment, the lead containers are the new air-pruned designs by BCC, Plant System 80 and Panth. Jiffy is also in the running, but has some advantages and disadvantages not shared by the other

three, which are more similar to each other. The Jiffy is undoubtedly the best container for the machine plant—no coming apart in the planting process."


AssiDoman was recently privatized, and has been working with the Sylva Nova planting machine for many years. "The machine is now planting three million seedlings a year at 25,000 seedlings a

with  
**BRUSH BLANKETS®**  
your ...the silviculture mulch  
**Trees grow Bigger, Quicker!**  
here's how

1. By eliminating competing vegetation
2. By raising the soil temperature
3. By retaining soil moisture

**NEW PRODUCT** **THE COOL BLANKET®**  
Cools around the tree collar and prevents root collar burning.  
For more information and a free sample, contact:

**ARBOTEC INDUSTRIES LTD.**  
Site 33 - Comp 21 - RR1, Princeton, B.C. V2A 6J6  
Tel: 604-493-1007 • Fax: 604-493-3666  
Toll Free: 1-800-561-9888

 **BRUSH BLANKET®**

**CANADIAN SILVICULTURE MAGAZINE**

**New Product Reviews**

**Features**

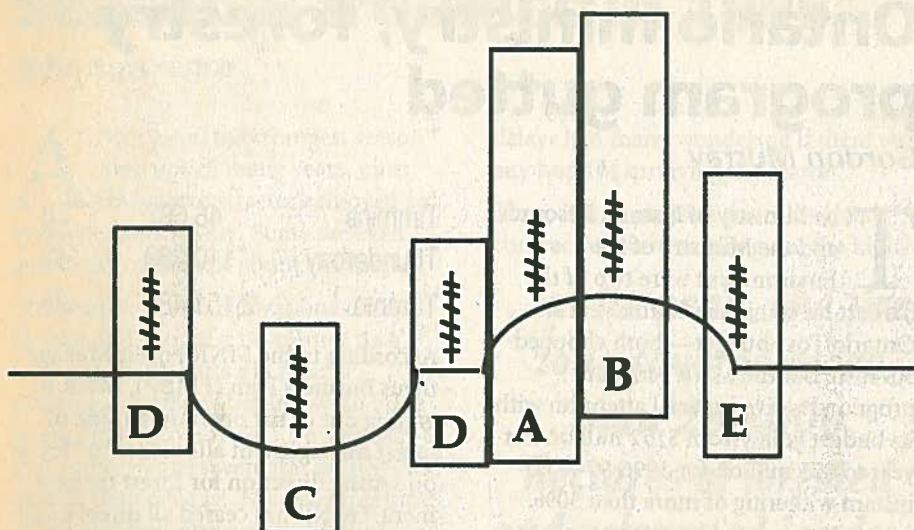
**Regional Reports**

**Opinions**

**Letters**

**All in Canada's only publication devoted to silviculture.**





day. The field performance of the seedlings is already reflecting the superior consistent quality of planting right behind the lightly compacted site prep." The Sylva Nova Planter prepares each spot, and then tamps it with low pressure tires just before planting in the spot. The planting head quickly moves ahead about 20 cm when it hits rock or wood. Sandberg attributes the improved growth from machine planting to the ability of the Nova Sylva to precisely position the seedling in its just site-prepped spot.

Showing me a diagram (see above), he explained, "We have surveyed seedling performance across dozens of sites throughout all of AssiDoman's operations. Positions A and B have the best height and diameter growth. Positions C, D and E are almost always only half as good."

Sandberg acknowledged that these results were for seedlings grown in first- and second-generation containers, and he still had to see if improved lateral root egress would change these results. In my visit to a Stora planting site,

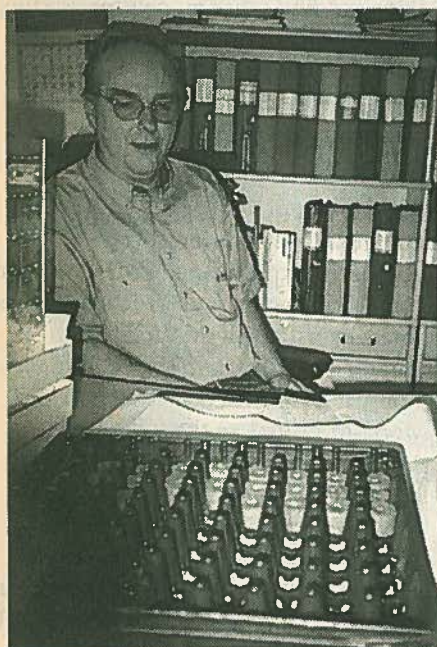
silviculturalists there did not seem to find the positioning on the site prep as critical.

At the AssiDoman and Stora nurseries, the extent of mechanization was impressive. AssiDoman is growing in a Panth system because adaptability to highly mechanized growing and handling is important.

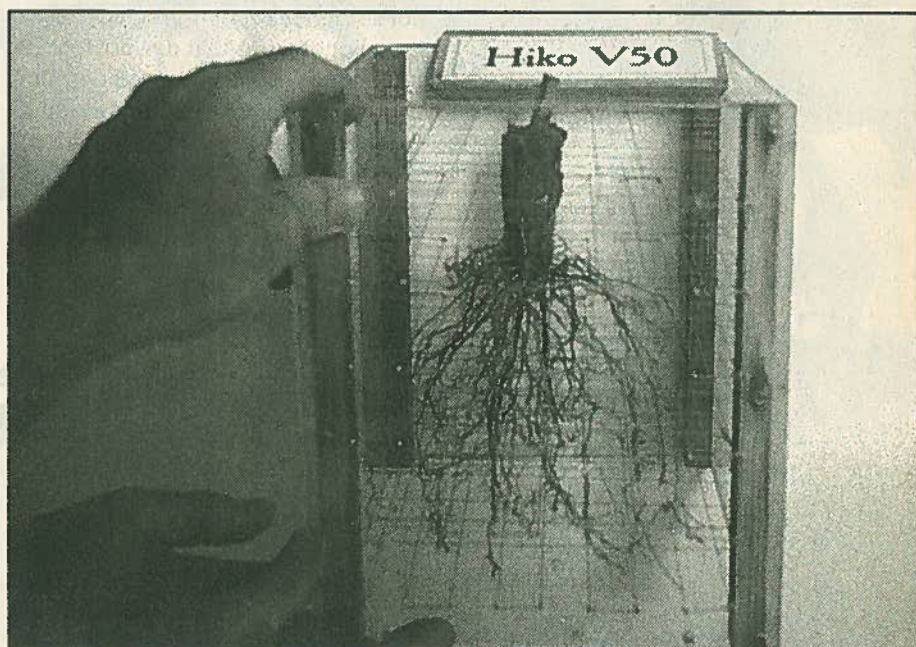
The AssiDoman contract to supply containers for a 70-million-tree annual production generated many design accommodations from competing suppliers. After two years of discussions, Sandberg worked with the three leading suppliers to a point where "a good grower could grow an equally good root form in these containers. The one with the most air-pruning surface per cubic centimetre is likely going to be able to hold the seedling the longest past the optimum 12-week point to accommodate operational delays and growing problems, without compromising the good root form. That, combined with price, will probably be the deciding factor."

Sandberg has been sending seedlings grown in the new containers to Lindstrom for testing, and he had exam-

...continued on next page



Lars Ove Sandberg, Chief Forester of AssiDoman



Lindstrom's root-form growth-chamber.



...continued from previous page

ples of Lindstrom's root-form growth-chamber tests in his office. The chamber test works as follows:

Seedlings are grown for six weeks in a mixture of sand and peat, which is then drained away by opening the bottom of the chamber. A three-dimensional grid of fishing line holds the initial lateral root-egress pattern in suspense for comparison with other container types.

Root form from first-generation (paper pot and smooth-walled plastic containers) or second-generation containers (hardwalled such as Panth, BCC, Hiko with root-training ribs) resulted not only in poor root growth, but in instability, poor wood quality and increased armillaria (up from 3% in natural plantations to 50% in container planted areas). This combination of problems raised the container design issue to the top of AssiDoman's corporate forestry agenda.

From observing and discussing the many problems visible in Lindstrom's "Hall of Horrors", I could understand that the Stora planter's disinterest in microsite selection was partially due to Stora's third-generation container. ♦

## Ontario ministry, forestry program gutted

Gordon Murray

The Ministry of Natural Resources and the Ministry of the Environment were two of the hardest hit ministries in this year's Ontario Tory budget—both chopped 30-40%. But the MNR's forestry program received special attention with its budget going from \$152 million last year to \$75 million for 1996-97—an instant withering of more than 50%.

David Deyoe is manager of the Ontario Forest Research Institute (OFRI), the forestry research arm of the MNR, and he says last year's forestry program budget was already less than half of what it was in the early 1990s.

MNR forestry staffing has gone from 1540 person years to 768 in the last year. MNR spokesperson Brian Blomme says that person-year figures are not directly comparable to positions and that the employee reductions come to about one-third of the staff.

A number of MNR offices will be closed or combined, and Blomme says this is not a result of forestry program reductions but overall MNR downsizing. The NDP opposition claims small northern communities were particularly hard hit by the MNR lay-offs. The opposition released a summary of the MNR layoff notices (totalled by community) to the government employees' union. This summary showed the disproportionate impact on small communities:

Community	Population	People laid-off
Blind River	3,913	15
Chatham	42,800	12
Cochrane	4,403	22
Kenora	9,570	27
Kirkland Lake	10,638	15
Temagami	929	27

Timmins	46,697	28
Thunderbay	110,289	42
Toronto	2,151,430	35

According to the MNR Forest Management Business Plan (FMBP), MNR is getting out of the operational side of forest management altogether to "focus on setting direction for forest management." MNR has ceased all direct planting programs, and is selling its nurseries.

MNR is also getting out of direct silviculture and seedling research. Deyoe says that OFRI has had its budget cut from \$14 million last year to \$5 million, and that staff has been reduced by two-thirds. According to the government, "MNR will concentrate its scientific and research activities on work that will support the development of policy and standards for forest management." Deyoe said that "the initial shock of the downsizing was devastating," but that OFRI is now looking to form partnerships and find other models for funding its research. Add this to last year's 60% cut in the Canadian Forest Service (and the closing of most of its research centres), and the forest industry becomes the only research game in town.

MNR is also getting out of the auditing and monitoring business with its "new approach to compliance." MNR will set monitoring policy and direction, but the forest industry will prepare its own compliance plans, self-inspect its operations, and perform necessary remedial work. According to the government, MNR will be "spot checking and analyzing" industry compliance plans. MNR spokesperson Brian Blomme pointed out the forest industry will be required to report any non-compliance in their operations to MNR. If an MNR

...continued on page 48

### Ontario Silviculture Contractors Association

125 May St. S.  
Thunder Bay, P3J 2V8  
Tel: 1-800-335-6658  
Grant Brodeur, President  
John Lawrence, Director



## Seasonal troubles in 1996

John Lawrence

After one of the strangest season start-ups in many years, most Ontario contractors enjoyed an average planting year. Some are even guardedly optimistic about the future.

The winter of 1995/96 was one of the longest and snowiest on record. As a result, in many parts of Ontario planting operations began two to three weeks later than normal. This meant that some planters were not on site until the last days of May. Moreover, getting to the planting sites was also unusually difficult as roads washed out across the province in a record season of spring flooding.

For contractors already extended financially due to the late start, increased access costs and/or further

delays had many wondering if there was any hope of surviving the season.

Then, just as projects got rolling and contractors were working out the kinks

***...at its peak, the fire zone covered more than 230,000 hectares of forested and reforested lands...***

endemic in this hectic industry, the fire season began. Particularly in the northwest of the province, the "fire flap" reached crisis proportion in a very short period of time. By the end of the

first week in June, several projects were shut down as a clearly overwhelmed OMNR struggled to get a handle on the situation. At its peak, the fire zone covered more than 230,000 hectares of forested and reforested lands.

For many contractors the season's troubles offered some positive spin-offs. The late start meant it was necessary to operate with larger crews which, although not easy, can be a bonus for the bottom line if well managed. As well, the fact that some crews were out of commission allowed the juggling of existing crews to boost projects that otherwise might have bogged down. And, of course, many crews were right back out there in July and August replanting burned plantations. ♦

**Coming next issue...**

# SILVICULTURE DIRECTORY

**The Definitive Guide to Industry  
Suppliers, Consultants & Contractors**



# Evolution sylvicole récente au Québec

Pierre Dubois

**L**e gouvernement du Québec adoptait en 1994 une stratégie de protection des forêts. Depuis lors, autant en forêts publique qu'en forêt privée, la sylviculture se tourne vers la régénération naturelle des forêts. Le reboisement devient complémentaire et sert seulement à remettre en production les superficies forestières qu'on ne réussit pas à régénérer naturellement.

Le niveau de plantation a culminé au Québec à la fin de la dernière décennie atteignant les 250 000 plants mis en terre, les deux tiers en forêt publique. Selon Michel Tremblay, de la direction des services administratifs et techniques du ministère Ressources naturelles du Québec, on pale maintenant de 100 millions de plants mis en terre en forêt publique et de 40 en forêt privée. Environ le tiers des arbres plantés seront dorénavant des plants de forte dimension (PFD), atteignant 1 m de haut, pour prévenir les problèmes de compétition et l'usage de phytocides. Malgré cela, on continue d'avoir besoin de dégager les plantations résineuses. En 1994-5, 19 110 hectares de plantations ont dû être dégagées, dont environ les trois quart au moyen de phytocide.

Outre le reboisement, l'éclaircie précommerciale est certainement le traitement sylvicole le plus répandu en forêt résineuse. En 1994-5, 28 992 hectares ont ainsi été éclaircis. La forêt publique québécoise compte, dans sa portion méridionale, une bonne proportion de forêts feuillues et de forêts où les arbres feuillus, bouleaux jaunes et érables principalement, sont mélangés aux conifères. La sylviculture de cette forêt feuillue et mélangée passe par des coupes d'amélioration, des coupes de préjardinage et de jardinage. Tous ces traitements sylvicoles visent à améliorer la qualité de la forêt laissée sur pied.

Avec la politique forestière appliquée en forêt depuis 1990, chaque usine possède un Contrat d'approvisionnement et

d'aménagement forestiers (CAAF). Des travaux sylvicoles sont obligatoires de façon à régénérer adéquatement les forêts ou à accélérer leur développement en vue de maintenir la possibilité forestière. C'est dans ce cadre légal que la plupart de entreprises forestières font appel à d'autres entreprises pour réaliser la sylviculture. Le Québec compte une cinquantaine de coopératives forestières, réparties dans les quatre coins du territoire forestier. En forêt publique en 1994-5, elles réalisaient 35% du reboisement et 47% des éclaircies et du dégagement des plantations.

Pour favoriser la sylviculture, le gouvernement permet aux propriétaires des usines de rembourser 40% de leurs droits de coupe en forêt publique par l'entremise de travaux sylvicoles. Par règlement, le gouvernement dicte les équivalences monétaires admissibles pour les travaux sylvicoles. Les détenteurs de CAAF se servent de ces barèmes pour rémunérer les entrepreneurs sylvicoles. Cependent, les détenteurs de CAAF se conservent souvent une marge de bénéfices et paient les entrepreneurs en dessous des montants prescrits. Michel Tremblay, du ministère des Ressources naturelles du Québec, explique que dorénavant: "les bénéficiaires vont devoir produire des pièces justificatives." Cette situation doit donc bientôt être corrigée.

Les travaux sylvicoles en forêt publique en 1994-5:

Travaux	hectares
Préparation de terrain	29 497
Reboisement	28 196
Regarnis de plantation	11 864
Dégagement de régénération	19 110
Eclaircie précommerciale	28 992
Coupe de préjardinage	5 507
Coupe de jardinage	36 084
Coupe d'amélioration	7 199
Autres	<u>2 052</u>
Total	168 501

## English summary

Since 1994, the use of natural regeneration has increased and reforestation has declined in Québec. From a high of 250 million seedlings in the 1980s, planting now stands at 140 million. One third of the seedlings are large dimension (up to 1m high) to better survive competition. Even so, 19,100 hectares of plantations had to be brushed in 1994-5 to release them from competition— about 75% with herbicides.

Precommercial thinning is becoming much more widespread in conifer forests with almost 30,000 hectares thinned in 1994-5. In Québec's deciduous and mixed stands, there is significant pruning activity which improves the value of the forests.

Forest companies operate under agreements (CAAFs) that require them to pay for regeneration and improvement. Most licensees hire contractors for their silviculture— the 50 Québec forestry cooperatives perform a large portion of this work. To encourage intensive silviculture, the government reimburses some stumpage to licensees for work done according to a fixed fee schedule. Some licensees are paying contractors less than the prescribed fees and keeping the difference— this problem needs to be corrected soon. ♦

## Association des Entrepreneurs en Travaux Sylvicoles du Québec

578, de Provence  
Chicoutimi, PQ, G7H 7C1  
tel: (418) 545-2893  
fax: (418) 545-4329



# Multiple-use rhetoric threatens Nova Scotia's last wilderness

Aaron Schneider

**T**he Tobeatic Wilderness Area is Nova Scotia's last true wilderness and the single most natural wild area left in the Maritimes. It's a unique wilderness of rocky barrens and glacial eskers, abundant with lakes and streams and stands of old-growth forest. And it's a critical habitat for pine marten, black bear, and moose — the last significant gene pool of our native species. It forms a broad corridor of Crown land wilderness between the borders of Kejimikujik National Park and the Tobeatic Wildlife Management Area to the east, and the Bowater Mersey Paper Company woodlands to the north and west.

Although NS is bound to comply with the Canadian-ratified United Nations Conference on Environment and

Development Biodiversity Treaty, which set the goal of preserving 12% of the wild natural areas of each nation, the NS Department of Natural Resources (DNR) says it will have difficulty finding 12% of wilderness in NS, suggesting 6% to be a more realistic figure. The outcome in the struggle between development (forestry and mining) and conservation (parks) in NS is that 0.25% of NS is now protected from all exploitative uses. National Parks increases the conserved area to a total of 2.5%, still very far from the goal of 12%. Against this background, logging and mining proposals are eating up areas that DNR's Parks Division considers candidates for protection under the

Parks Act (1988).

Even though the Tobeatic Wilderness Area is a candidate for protection and could be the most significant contribution that NS could make to its 12% protected areas commitment, the DNR has accepted a proposal to log in the northern extension of this area called the "Tobeatic Finger." This finger of Crown land contains the headwaters of major river systems flowing into Kejimikujik National Park, and is a crucial protective buffer between the Park's northwest boundary and Bowater Mersey's timber lands. The Lewis Sawmill Ltd. of Weymouth, NS, proposed to log ten-million board-feet

...continued on next page



**FROM PLANTING TO THINNING TO SITE PREP,  
READ ABOUT IT ALL IN CANADA'S DEFINITIVE  
REFORESTATION MAGAZINE.**



**CANADIAN  
SILVICULTURE  
MAGAZINE**

**SUBSCRIBE TODAY!**

**To place your order:**

**Telephone**

**(604) 669-3975**

**Fax**

**(604) 875-1403**

**One year (4 issues)**

**\$19.26 (incl. GST)**

**Two year (8 issues)**

**\$32.10 (incl. GST)**

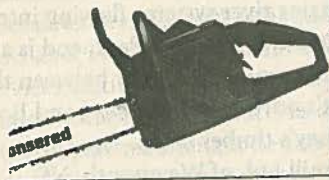


# JONSERED

**BUY NOW AND  
SAVE**

## Jonsered 2045 Turbo

45 cc, 2.2 kW, 4.7 kg/10.6 lbs, 16" - 18"



## Jonsered 2050 Turbo

49 cc, 2.4 kW, 4.7 kg/10.6 lbs, 16" - 20"



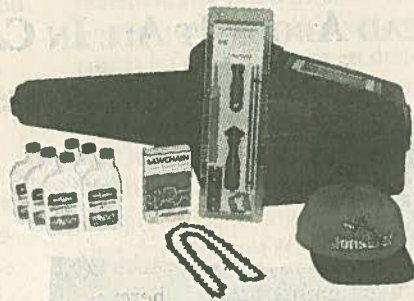
## Jonsered 2054 Turbo

53.2 cc, 2.5 kW, 5.2 kg/11.2 lbs, 16" - 20"



# FREE

**JONSERED «MASTER KIT»**



value of  
**\$130**

Read our special Turbo brochure and learn how you can start saving both time and money

## Jonsered

JOSA CORPORATION LTD./LTEE, Lachute, Qc, Tel. 514-562-8872, Richmond, B.C. Tel. 604-275-6610.  
North Bay, ON, Tel. 705-476-8080, Moncton, N.B. Tel. 506-859-8714, Corner Brook, NF, Tel. 709-632-7557.

At participating dealers for a limited time only while supplies last.

## NOVA SCOTIA

...continued from previous page  
of timber, including old-growth pine, over a ten-year period from the Finger. The scattered distribution of the desired timber stands will require extensive road building, providing access to thousands of acres via cars, trucks and all-terrain vehicles, resulting in increased poaching and fragmentation of the remaining ecosystem.

### Multiple users

While the DNR is committed in principle to protecting some of the Tobetic Wilderness, it is also committed to the concept of "multiple use," which allows mining and logging enclaves within the area. The former (Tory) DNR minister said he would not "lock up the Tobetic against all other uses," and the present (Liberal) DNR minister says his priorities are to protect water courses and provide buffer areas to "preserve the wilderness experience," if not the wilderness itself.

The forces at work here are apparently supra-political and affected by developers such as the giant Irving Corporation, a 49% shareholder of Lewis Sawmills Ltd. Irving recently bought the Bowater lands adjacent to the Finger, where it has been road building and logging intensively, using floodlights to keep large felling machines working through the night. Fortunately, not all of the timber industry operators are as rapacious as Irving, and some support total preservation. The Nova Scotia Silviculture Contractors Association (NSSCA) endorses the protection of 12% of NS as a natural preserve, and is opposed to logging in the proposed Tobetic Wilderness Area. The association is concerned with the negative image of Canadian timber industries at home and abroad, and the consequent restrictions and boycotts. According to NSSCA, "the ramifications of the disturbance of this wilderness area and other special places must not be underestimated as to the effects on the silviculture industry."

A major assault on the basic concept of



protected areas comes from the NS Chamber of Mineral Resources. The mining industry is lobbying hard to have the Tobeatic and other areas (Pollets Cove and the Margaree Canyons on Cape Breton) dropped as candidate sites — a possible reason for the long delays in releasing the Parks Systems Planning Study for Protected Areas. The plan, to have been released by July 1993, had been reopened for extensive internal (DNR) review and was not presented for public review until January 1995 — nineteen months late. Although there is a moratorium on new timber and mining leases in the 31 areas now under consideration, the delay could allow time for mining and logging interests within DNR to make their intrusions into the plan.

Also the provincial moratorium on uranium exploration has not precluded the renewal of the uranium exploration lease to Falconbridge for Moosehide Lake in the Tobeatic Wilderness Area. Only a few years ago, strong public resistance stopped the plan for a uranium mine there, and brought in the moratorium on exploration, which expires in 1996.

### **Protectors**

The Tobeatic Wilderness Committee (TWC) is a group of private citizens that has organized public response to the immediate threats of logging and mining in the Tobeatic Wilderness Area. TWC campaigned against the DNR's multiple-use concept, and proposes that the entire Crown buffer zone be protected by appropriate legislation against consumptive uses. TWC has carefully researched boundaries, critical areas, special places, and extensive recreational use by canoeists, guides, naturalists, sportsmen, Girl Guides and Boy Scouts.

TWC prepared maps and information for public presentations, and gained the support of numerous provincial and municipal organizations, naturalists, silviculture contractors, recreation commissions and boards of trade. Although Lewis Sawmill declined an invitation to meet, TWC met repeatedly with present

and former ministers of DNR and their advisors. The committee prepared media packages for local and provincial newspapers, and worked to expand support and encourage a massive public response to the Park Plan when it was released for review in January 1995. TWC attempted to influence the DNR internal review in every way possible, and continued to lobby for the inclusion of the Finger with the full support of the municipal councils and boards of trade of both Digby and Annapolis counties, which share a border through the Finger.

The Keji National Park staff are studying the West River watershed, which would be compromised by the logging proposed for the Finger. However, Parks Canada has only requested a one-kilometre buffer around Keji, seriously weakening the position for protection of the Finger. Because the boundaries of Keji were never drawn ecologically, there is a strong argument for protecting the Finger as a way to secure and protect from logging and mining damage the watersheds for ecosystems within the park. Although Parks Canada has neither power nor jurisdiction outside the Keji boundary, its request for protected watersheds would add necessary weight for protection. The park superintendent went on record to express concern for the water quality and trout populations in brooks and rivers heading up in the Finger.

Under pressure from TWC, DNR found 95% replacement for the timber agreement with Lewis Sawmill by substituting an alternative supply from elsewhere; a half-million board-feet commitment still remains. Although Lewis conceded that the Crown wood supply is not critical to its survival and that private wood is available, the company still insists on its rights to that timber.

### **The arguments**

Sacrificing the increasingly rare long-term opportunity of wilderness preservation for the commonplace short-term gain of logging makes little sense. Even if economics were the major consideration here, the potential of this large con-

tiguous wilderness has far greater value for long-term economic gain. Keji has 10,000 visitors each year already, and according to the Canadian Tourism Attitude and Motivation Study, 30% of Canadian tourists (over five million) favour wilderness travel and wildlife as do tourists from the UK, West Germany and Japan. In 1986, more than half-a-million person trips were made to Nova Scotia by Canadians alone, for its "general wilderness and undisturbed nature" venue.

However, Lewis, Bowater Mersey and other forest-related industries operating in Digby County argue that the Tobeatic Wilderness Area should be managed by industry to prevent the degeneration of over-mature forest. Some even extend the argument to include Kejimikujik National Park. Following public review, Bowater Mersey threatened to cut its private woodland preserves if the province goes ahead to protect the candidate sites. Again, and fortunately, not all the forest industry shares that view: NSSCA and the Canadian Silviculture Association both support TWC's efforts to protect the Tobeatic Wilderness Area.

The argument for multiple use is becoming less compelling as the public begins to see there is not enough space to both secure wilderness and produce commodities from every piece of Crown land. It is also becoming clearer that, despite economic downturns, public interest is greater served by preserving the few bits of wilderness remaining than by consuming them. The difficulty is competing with the interests of politically entrenched, large corporations.

### **And the winner is?**

As a result of a public review held in early 1995, the review committee for the Proposed Systems Plan for Parks and Protected Areas recommended that the province designate all of the 31 proposed sites as areas protected from mining, logging, roads and utility corridors. It also made a specific recommendation that the Finger be included in the Tobeatic Protected Area, and recog-

*...continued on page 49*



# PEI proposes to certify forest contractors

Wanson Hemphill

As part of the PEI Forest Code of Practice, the province is proposing to certify forest contractors. The forest code identifies a forest contractor as "an individual or company who has one or more employees or contracts with one or more people and harvests more than 500 cubic metres of softwood per year."

By certifying forest contractors, the PEI Forest Improvement Association hopes to:

- encourage and protect good forest operating practices;
- discourage and punish poor forest operating practices;
- protect the forest environment, island waterways, and wildlife;
- encourage a safe working environment;
- improve forest contractor and forest worker image and reputations;
- save young forests for maximum yields and supply shortages; and
- improve landowner/contractor relations.

Forest contractors have agreed to an imposed annual certification because they see the following benefits to their industry:

- a reduction in the risk of larger outside contractors coming to PEI;
- a level playing field so that everyone is operating by the same rules;
- an improvement in the overall image and reputation of the forest contractor profession;
- the ensurance of a future wood supply and the survival of businesses;
- the elimination of any "bad apples";
- an increase in the available private wood supply with responsible contractors; and
- protection for the forest environment, water and animals.

## How it will work

Contractors will be required to apply annually for certification to the provincial forestry department. Certified contractors will have to meet the following criteria:

- provision of a safe working environment;
- provision of Workers Compensation coverage;
- copies of landowner contracts made available;
- registration with Revenue Canada;
- 4% vacation pay paid on gross earnings; and
- adherence to the Forest Management Act and Environmental Protection Act.

Failure to apply for certification could result in \$1000/ha for a first offence and \$2000/ha for subsequent offences. ♦

## P.E.I. Forest Improvement Association

Box 27,  
Victoria, PEI  
C0A 2G0

Ian Dennison, President

Wanson Hemphill,  
General Manager

## Efficiency or unemployment?

Wanson Hemphill

A rule of thumb says that each forest harvesting machine replaces ten chainsaw operators. Sweden went from 100,000 forest workers in 1980 to 10,000 in 1990, and cut the same amount of wood. Is this progress? Consider the following comparisons:

- operating a chainsaw for a living is hard work and often seasonal in nature;
- operating a forest processor is less labour-intensive and the machines can operate 24 hours/day all year;
- chainsaw operation and manual felling is more dangerous than working in an air-conditioned cab;
- stress, back, wrist and ergonomic injuries are more likely with machine operations;
- machines can produce wood cheaper than manual operations with sufficient volumes;
- machines are expensive and don't provide comparable employment numbers with manual operations;
- larger contractors are selling wood on the world market in competition with mechanized operations locally and in other jurisdictions;
- manual operations find it difficult to maintain profit margins while competing for stumpage and having a higher cost of production;
- forest machines need to produce a certain volume of wood to match machine payments, expenses, depreciation and profits;



- manual operations don't need as much wood and can produce according to market fluctuations;
- Workers Compensation rates continue to rise adding to manual production expenses;
- machine operations pay less workers compensation rates, work in all weather, and don't ask to be laid off.

Apparently, once some contractors in an area have machines and can pay higher stumpage, then other local competitors feel pressured to mechanize and compete. As wood supplies decrease, competition for stumpage will increase forcing more efficiency, slimmer profit margins, and greater economies of scale. This may force smaller manual operations to find different market niches, specialize, reduce their production costs, mechanize or go out of business.

What will be the social cost of more people out of work as machines replace people? Increasing welfare numbers or taxes is not the answer. But governments, communities and citizens must work together to find alternative and creative ways to enable people to find meaningful and productive employment. ♦

# STUMP PULLING PERFORMANCE!

## Super Freewheeling Deal! Winch Package

The '97 models are here now, with even more Stump Pulling Performance! The "Super Freewheeling Deal" starts July 1<sup>st</sup> and ends October 31<sup>st</sup>, 1996. Receive a Super Freewheeling Deal Package FREE with your purchase of a new, unused 1995, 1996 or 1997 Suzuki King Quad or LT-F4WD.

Ask your dealer for details and get a "Super Freewheeling Deal!"



**SUZUKI**  
The ride you've been waiting for!™

**Harbour City Motorsport**, 1613 Bowen Road, Nanaimo, BC  
(250) 754-3345

**Holeshot Racing**, 20560 Langley Bypass, Langley, BC  
(604) 533-4426

**International Motorcycles**, 3030 St. Johns Street, Port Moody, BC  
(604) 461-4143

**Neid Enterprises Ltd.**, 4921 Keith Avenue, Terrace, BC  
(250) 635-3478



# FRBC-funded silviculture study will benefit industry

Roy Biv

**F**orest Renewal BC has agreed to fund a major study of British Columbia's silviculture industry. The survey proposed by the WSCA is expected to be completed this winter and includes an analysis of reforesta-

tion, stand-tending and site preparation contractors across the province.

"This study is long overdue," said WSCA Forest Renewal Coordinator John Betts. "The last analyses of any kind on our industry were completed ten years ago. Not only is most of that information out of date, it also lacks a comprehensive overview of the whole silviculture business in the province."

The proposal includes a number of phases for the study including assessing the current status of the industry in terms of composition and capacity, as well as analyzing the anticipated demand for silviculture work in the future. The study will review each industry sector on a regional basis, combining the results in a provincial overview.

"With this assessment we will have an essential status-of-the-industry report. We will know how many workers there

are in the various sectors like treeplanting or juvenile spacing or tree nurseries. We will know how many contractors there are. We'll find out how active the businesses are, and how fully employed their workers are. We will

also be able to make an informed estimate of the industry's current capacity."

Betts says the timing of the proposed report is critical, pointing out that various FRBC and government initiatives need accurate

information about the silviculture industry if they are to be effectively implemented. He says he is worried that some serious misconceptions about the industry still seem to be guiding policy at the political level.

"Premier Clark once described the BC silviculture industry as out-of-province workers taking jobs away from BC com-

*...some serious misconceptions about the industry still seem to be guiding policy at the political level...*

## Western Silvicultural Contractors Association

720-999 W. Broadway  
Vancouver, BC V5Z 1K5  
tel: (604) 736-8660  
fax: (604) 738-4080

*Peter Gommerud,  
President*

*Lee Maxwell, Treasurer*

*Karline Mark-Eng,  
Administrative Secretary*



### 450 SUPER DUTY USERS

- ★ Service Trucks
- ★ Fire Suppression Trucks
- ★ Search & Rescue Trucks
- ★ Ambulances

## Clydesdale FOUR-WHEEL DRIVE CONVERSIONS

For more information call:  
**(604) 374-7175**



### VAN USERS

- ★ Crew Vans
- ★ Ambulance
- ★ Towing
- ★ Recreation

SPORTSMAN FOUR WHEEL DRIVE CENTER 1394 HUGH ALLAN DRIVE KAMLOOPS BRITISH COLUMBIA V2B 6E9



munities, and now we have Forest Minister David Zirnelt saying the same thing recently after his announcement about FRBC backlog reforestation in Northern BC. Both of these politicians and the people who advise them need to be disabused of this inaccurate view of the silviculture industry. This study should help show that we are an industry that draws most of its workers from all over the province. We are not taking work away from any communities. We are from those communities."

Betts says the industry assessment revealing the structure and composition of the industry will be combined with the other major component of the study: a review of the opportunities in silviculture work across the province. By comparing capacity with anticipated demand, he says FRBC will be able to strategically plan where field programs are needed, and where training and contracting infrastructure need to be developed.

"From FRBC's point of view, this project will be like the Rosetta Stone of much of their land-based program. It will translate policy into practice and help develop a strategic planning framework for the corporation."

Still, Betts says the study is most likely to help the silviculture industry.

"We will be able to take a look at our own industry based on some hard facts. The industry itself needs a strategic plan to cope with the changes going on in BC's forest industry. This information might at least make us more aware, if not more in control, of our industry."

The study will include canvassing contractors across BC by phone and questionnaire. The WSCA is urging contractors to cooperate with the survey.

"This study is in our own long-term interests as individual businesses and as an industry," Betts said. ♦

# Preventing treeplanting injuries

## BC Workers Compensation Board

**B**ased on planting 1,600 trees per day, a treeplanter

- Lifts a cumulative weight of over 1,000 kilograms
- Bends more than 200 times per hour
- Drives the shovel into the ground more than 200 times per hour
- Travels about 16 kilometres on foot while carrying heavy loads

The way in which these activities are done—for example, forcefully gripping the shovel and trees, and twisting and bending the wrists—can contribute to injuries.

Some injuries suffered by treeplanters are muscle strains to the back, shoulders, or knees. Other injuries are diseases such as tendinitis—a painful swelling of the tendons—and carpal tunnel syndrome—an injury to a nerve in the wrist. Injuries to the wrists and back combined make up almost half (47%) of all reported injuries.

Some ways you can help prevent injury and disease:

- Precondition your body, phase-in to work, and pace yourself
- Choose the appropriate shovel
- Recognize early signs and symptoms of injury
- Use good planting techniques

Between planting seasons, your body adjusts to less demanding physical activities that don't involve the physical requirements of planting trees. Whether you are a first-time treeplanter or a treeplanter returning for another season, your body needs to adjust gradually to new physical demands.

Muscular aches and pains are common during the first week of planting, but the effects of these aches and pains can be reduced by conditioning your body—for example, by running, biking, hiking, weight training, etc.—before the season begins.

When you start planting at the begin-

ning of the season, pace yourself by working slower, carrying and planting fewer trees, or working shorter days to get your body used to the work. Stretch your back and shoulders from time to time. Relax your hand muscles throughout the day by opening and closing your fingers frequently.

Choose a shovel that is the right length for you. If the shovel is too long or too short, it will not allow you to keep a healthy posture—your back straight, not hunched over. Because shovels are carried and lifted up and down all day, they should be lightweight.

A straight-handled shovel is preferable because it keeps your wrists straight and positioned to get the most power. A D-handled shovel may sometimes be lighter in weight, making it easier to carry, but using one can result in more bending of the wrist. This is especially true when using the shovel to make the hole. Keeping your wrists straight helps reduce the risk of injury to your wrists and arms.

Some planters keep a number of different shovels on hand to accommodate different planting conditions.

### Recognize early signs and symptoms of injury

Numbness, tingling, swelling, redness, and pain in the wrists, shoulders, or back are possible signs and symptoms of injury. If you continue to plant when injured, the symptoms could progress into a more serious condition. If you experience signs or symptoms of injury, take appropriate action:

### DO

- Report the symptoms to your supervisor and get first aid
- See a physician, if necessary
- Give your muscles and tendons a

...continued on next page



...continued from previous page

break— take a day or two off and do chores around camp or work a shortened day

## DON'T

- Take painkillers without the consent of a physician— they may make you drowsy and may only numb the pain temporarily
- Continue planting— this will only

worsen your condition

- Tape your wrist and continue to work— this may worsen the injury
- To help minimize signs and symptoms of injury:
- Move to softer ground, if possible, rather than pounding too hard to start a hole
- Change hands regularly, if possible, to avoid overusing them
- Use your foot and leg to drive the

shovel in and open the hole, not just your arms and back

- Keep your wrists straight as much as possible
- Loosen your grip on the shovel and the seedling
- Check your technique routinely to ensure you are using proper posture and keeping your wrists straight
- Bend your knees when bending over ♦

This article is excerpted from the BC WCB pamphlet "Preventing tree planting injuries." To receive the complete publication, call the WCB at 1-800-661-2112.

## Safety on the road

Dirk Brinkman

The summer of 1996 has seen more tragic vehicle accidents affecting the silviculture industry.

Ten years ago my company experienced the saddest and most painful event in its history. Michele, my best friend's niece, was killed when she was thrown out of a rolled crew cab on a contract he was supervising in Ontario. I had known Michele as she grew through her 19 years of life. She was an exceptionally creative person dedicated to helping those in the developing world. Another passenger in that truck, David, now working in BC's MOE, suffered permanent spinal nerve damage.

A young and inexperienced driver had decided to take the vehicle to town on a day off without supervisor authority. Their good intention was to take a fellow planter to have some injuries— from an also unauthorized quad ride—checked out. On the way back, the driver lost control of the truck on some loose gravel. The vehicle was in good mechanical condition, but Michele was not wearing a seat belt.

# HONDA FOURTRAX

## Get More Than You Bargained For!

This fall Honda Fourtrax dealers are offering you MORE! You always get Honda's legendary reliability, industry-leading engineering and the toughest trail and utility All Terrain Vehicle in the business... Now, for a limited time while supplies last, your Honda Fourtrax dealer is offering BIG BONUSES\* on Honda Fourtrax ATVs. Check these out...



### Foreman TRX400 4x4

Get sporty, agile handling from a hard-working utility ATV? You bet! The Honda Foreman's superior power-to-weight ratio, revolutionary chassis design and unique sideways-mounted engine delivers a new level of ATV performance.

**\$300 Free**  
Accessories on TRX 300 4x4  
& Foreman 400

### TRX300 4x4

There's a good reason why the TRX300 4x4 is the best-selling ATV of all time! Year after year it's ranked as the best all-round performer, delivering nimble, sporty performance with unmatched utility capability.

**No Charge**  
Speedo Kit on TRX 300 4x4  
& TRX 300 2x4



\* At participating dealers. Quantities are limited. While supplies last only!

**Cycle North**  
780 3rd Avenue  
Prince George, BC  
(250) 563-5091

**Remple Sales**  
195 Keis Avenue  
Quesnel, BC  
(250) 992-6332

**William's Lake Honda**  
871 S. Mackenzie Avenue  
William's Lake, BC  
(250) 392-2300



A recent internal BC WCB report reveals that in the six years from 1989 to 1994 nine treeplanters were killed, all by vehicles. Each of these individuals' deaths was tragic, and the incidents which led up to them each had their own peculiar set of circumstances. However, most of them shared the same primary contributing factors: inexperienced drivers and/or individuals not wearing seat belts.

### ***Inexperienced drivers***

Bush road conditions can be extremely dangerous. Safely driving heavily loaded vehicles on loose gravel or other extreme road conditions requires experience, which can only be gained under the direction of those who are experienced. It is a credit to BC's experienced bush drivers in both the silviculture and forest industries that there have not been more serious accidents.

FRBC programs are training many new silviculture workers in BC. The WSCA should consider directing the development of a Bush

Driving Course that teaches the skills of driving on loose gravel, through water bars, mud and snow.

Due to the Forest Practices Code, driving hazards—such as water bars—are far more frequent on bush roads, and to be environmentally effective, they cannot be vehicle friendly. Some days, during the 1996 season, silviculture drivers crossed several hundred water bars a day.

### ***Seat belts***

In over half of fatal accidents, the vehicle did not have enough seat belts available for the number of the passengers. As well, some passengers that had seat belts were not wearing them. Requiring the unique individualists who make good treeplanters to put on a seat belt is not always easy. Requiring contractors to provide a seat belt for every passenger is easier. The WSCA has long called for WCB and MOF to enforce silviculture vehicle safety regulations. ♦

## **Legislation hurts silviculture crews**

*Roy Biv*

**T**he minister of forests says the silviculture industry will be consulted to help implement recent legislation giving priority hiring for displaced forest workers on FRBC-funded projects, and calling for the creation of an agency to match unemployed workers to jobs. David Zirnhelt made the promise during debates in the legislature this summer over Bill 12—legislation criticized by silviculture contractors because it could exclude existing silviculture crews from Forest Renewal work.

"The minister doesn't want to ram this legislation down everybody's throat," said FRBC Chair Roger Stanyer in an interview following the introduction of the bill in July. "He knows this legislation won't work unless there is cooperation from industry."

So far the silviculture industry has remained skeptical about the bill which, when it was first introduced during the legislature's last sitting before the spring election, was known as Bill 20. The Western Silviculture Contractors' Association opposed the legislation and visited the minister of forests to make the point.

"We told the minister we had some concerns about the bill because it didn't recognize the existing silviculture industry," said WSCA President Peter Gommerud. "We asked for an amendment specifically recognizing and protecting the existing silviculture industry. It doesn't look like we got it."

Gommerud says contractors are still concerned that the bill, and the pro-

## **Silviculture conference moves to Victoria**

*Roy Biv*

**T**he Western Silviculture Contractors' Association will be taking their 1997 Western Silviculture Conference on the road—to Victoria—on February 6 and 7. After many years of meeting in Vancouver, the Association hopes the move will get them a little closer to the ears and seats of power in the province.

"We will have more access to ministry and FRBC people if we meet in Victoria," said Bill Sinclair, Chair of the WSCA committee in charge of the conference and AGM. Sinclair says the response to the change of venue has been good from both contractors and trade representatives who help sponsor the event. Following Sinclair's recommendation, the WSCA board approved the change at its fall board meeting, September 19.

"I'm quite excited about how this year's conference is shaping up," said Sinclair. "We are on the threshold of some major develop-

ments in the silviculture industry, and this is our chance to gain some important notice in Victoria."

The AGM committee is still developing the main theme and speaker list for the meeting. However, Sinclair says an important part of the conference will be an interim report from the silviculture industry assessment study, currently planned for this fall and winter. Sinclair says that study alone should draw a crowd. At the same time, developments in the stand tending industry on the West Coast, particularly how Bill 12 is implemented, should draw spacing, brushing and weeding contractors out of the woodwork.

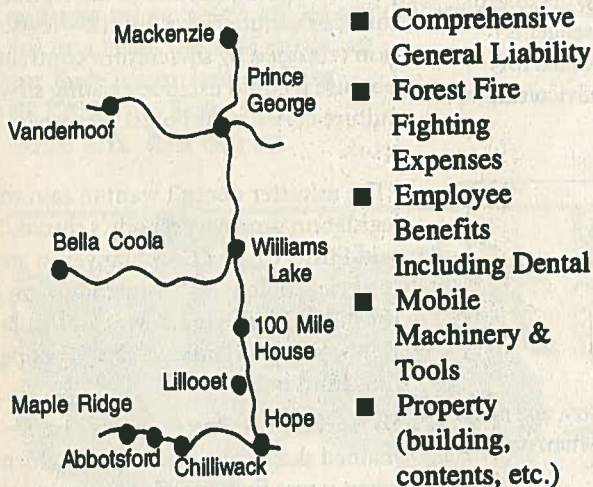
"We're planning for an enthusiastic and good turn-out from across the province and from all sectors," said Sinclair. The AGM committee will begin promoting the meeting this fall leading up to the February conference. ♦

...continued on next page



## INSURANCE YOU CAN RELY ON. PEOPLE YOU CAN BELIEVE IN.

We offer a custom tailored  
and highly competitive  
insurance package  
underwritten by



*The official insurance brokers  
for the Western  
Silviculture  
Contractors'  
Association.*



### Contact:

**Ken Robertson**  
North Central  
604-564-2211

**Chad Robertson**  
Cariboo  
604-392-6565

**Ian Robertson**  
Fraser Valley  
604-795-5761

575 Victoria Street, Prince George, B.C. V4L 2K2

...continued from previous page

posed agency could be used to direct FRBC-funded work to laid-off loggers, mill workers and community groups while traditional skilled silviculture crews are disqualified. Ironically, they would qualify for FRBC jobs once they're displaced. Despite having their specific request ignored, Gommerud said the WSCA is prepared to sit on any advisory board or committee established to see the implementation of the controversial legislation.

The Liberals voted for part of the bill giving priority hiring for displaced forest workers, but balked at setting up the agency saying it would create another layer of bureaucracy. The Reform party questioned the validity of targeting just displaced forest workers. Jack Weisgerber pointed out that laid-off fishers should have priority hiring, too, on watershed restoration jobs because their resource has suffered due to former logging practices that FRBC work is now trying to mitigate. Other critics of the legislation say it violates the Charter of Rights and Freedoms by restricting access to public-funded programs.

FRBC has yet to say how or when the Bill 12 consultation will take place or which parties will be included in the process. ♦

...continued from page 36

spot-check discovers they failed to report a non-compliance incident, they will have to pay an administrative fine as well as performing the remedial work.

In addition, there will be third-party "independent" audits of Sustainable Forest Licenses every five years before they are renewed. These are meant to ensure that the licensees live up to their forest sustainability commitments. However, the recent release of Forest Management Audits from the early 1990s does not inspire confidence.

For example, the audit report on the Buchanan Group's Lac Seul FMA (obtained by environmentalists under the Freedom of Information Act) stated that "during the period under review, only 40% of the planned regeneration activities took place. This reflects poor planning and implementation of regeneration strategies. The [review] Committee interprets this as a pursuit of short-term profits at the expense of long-term sustainability... The imbalanced manner in which harvesting is taking place... will jeopardize the sustainability of the forest and the company." Nevertheless, MNR renewed Buchanan's licence for another five years.

One of MNR's new responsibilities will be to "enhance information management about the forest," such as compiling and disseminating forest data through a common database. This means policy, planning and PCs (the computer kind) will be the new MNR mantra. However, industry will be responsible for collecting all the data including the Forest Resource Inventory.

...continued on next page



Tim Gray, Wildlands League's executive director, says that the lack of public accountability in this new industry-driven process may end up shooting the industry in the foot. He believes that once the story gets picked up in the international media, Ontario will become an eco-pariah. "Industry could have problems in gaining green certification of their forest products," which would be a marketing disaster. There has even been speculation that the MNR is so weakened that it will be collapsed into another portfolio, or perhaps it will be renamed Ministry with No Resources. For the moment, however, the media seems to be paying very little attention to this massive shift in MNR's direction. ♦

## NATIONAL

...continued from page 32

**Sustainability:** The Canadian Approach," uses some cautious self-evaluation indicators for sustainable development. But even with this conservative approach, one indicator ("Regeneration: Are harvested lands regenerating?") has the very unsatisfactory response that "no new regeneration data are available for this year's report." It notes that the proportion of selection cutting is increasing, although it is not likely to replace clearcutting completely.

A more candid and proactive response to these crucial regeneration questions are needed for a 1996 report to avoid the image that Canada is playing a smoke-and-mirrors game. ♦

## NOVA SCOTIA

...continued from page 41

nized the Tobeatic as the Maritime's largest true wilderness area. However, to date, no decision has been taken by the DNR to include the Finger, and although a moratorium on logging is still in force, Irving continues to press for its quota of timber from the area for Lewis Sawmill.

There is also growing concern that even the 95% timber replacement announced over a year ago may be evaporating into myth as the province assesses its over-commitment to timber leases. In a recent letter to the TWC chair, Minister of Natural Resources Don Downe wrote: "Regardless of the final land-use designation(s) that may ultimately be assigned to the Finger area, specific management objectives will be established that recognize the significance of the headwaters of streams that drain toward Kejimikujik National Park." It appears that multiple-use rhetoric will die hard in NS. ♦

*Reprinted from the International Journal of Ecoforestry, Vol. 12, No. 1. For subscription information, call (604) 598-2363.*

## SILVIDATES

To list your event, send your correspondence by fax to (604) 875-1403; by post to *Canadian Silviculture Magazine*, PO Box 65506, Station F, Vancouver, BC V5N 5K5; or by e-mail to [gordon\\_murray@mindlink.bc.ca](mailto:gordon_murray@mindlink.bc.ca)

### Forest Engineering Research Institute of Canada

The workshop will focus on aspects of the industry in Alberta and will cover growth and yield, operations, effect of commercial thinning on other resources, and products from thinnings.

**Theme:** Commercial thinning workshop

**Location:** Whitecourt, AB

**Date:** October 17-18, 1996

**Contact:** (604) 228-1555

### Western Forestry and Conservation Association Conference

**Theme:** Soils and forest productivity

**Location:** Portland, OR

**Date:** October 20-22, 1996

**Contact:** (503) 226-4562

### Society of American Foresters Annual Convention

**Theme:** Diverse forests, abundant opportunities, and evolving realities

**Location:** Albuquerque, NM

**Date:** November 9-13, 1996

**Contact:** (301) 897-8720

### Canadian Forest Service

Incidence of Armillaria species in precommercial thinning stumps

**Theme:** 1996-97 research seminar

**Location:** Victoria, BC

**Date:** November 21, 1996

**Contact:** (604) 363-0600

### Exfor '97

**Theme:** CPPA exhibition and annual general meeting

**Location:** Montreal, PQ

**Date:** January 27-31, 1997

**Contact:** (514) 866-6621

### Western Silvicultural Contractor's Association

The WSCA's annual general meeting will feature sessions on the contractor's role within FRBC, the struggling spacing industry, labour law, sheep grazing challenges, and the silviculture trade show.

**Theme:** Silviculture contracting in transition

**Location:** Victoria, BC

**Date:** February 6-7, 1997

**Contact:** (604) 736-8660



# NOTES FROM THE LEDGE



STYLIN' TRENDS

A VIEW FROM THE  
BARBER'S CHAIR

MILLENIUM MURKINS FROM XERO & G.M.



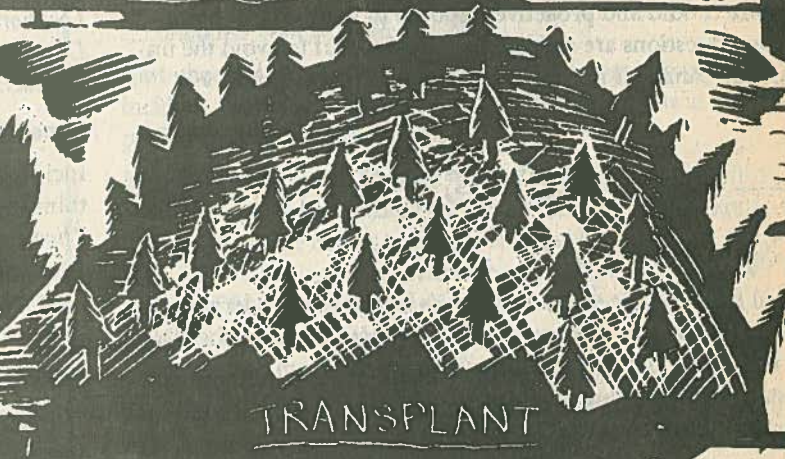
MOHAWK



HIP HOP



BALDING



TRANSPLANT



BUZZ CUT #2



FRINGE