

Volume 7 No. 1

From the Dean's Desk

Forestry in a Post-Modern World¹

The practice of forestry has its philosophic roots in the "Age of Enlightenment" where reason and science came fruitfully together to explain many phenomena formerly attributed to God. Galileo pointed out the simple logic of Sun-centred planetary orbits (and faced the Inquisition for doing so); Newton provided a mathematical model of celestial mechanics which made useful predictions about the trajectories of planets and comets. Science in hand, humans could dominate Nature (or so it seemed), and therefore stood apart from it.

Forestry works from similar premises that, for example, a certain management prescription will reliably produce a specific volume of timber or a specific kind of wildlife habitat predictably over time. We manage natural systems to provide the outputs people want — more timber, larger populations of particular wildlife species, and large areas where we "protect" Nature.

Many now question this basic premise of forestry — that science provides a comprehensive basis for management action. In part, the questions come from postmodernist critiques of science: for example, the feminist deconstructionist claim that to assert the authority of science is simply another way to perpetuate male dominance. In part, the questions come from the failure of sciencebased management to preclude human degradation of interesting and important ecosystems - air and water pollution, unintended loss of forest cover, extinction of species. In part they come from the inability of science alone to establish desirable goals for management; the currently popular notion of "ecologically sound" management, by itself, excludes very little until some particular ecosystem state is declared preferable to other possible ones.

And, in part, the questions come from scientific inquiry itself. For example, ecologists now understand the overwhelming role of stochastic events, especially stand-replacing disturbances, in determining the state of forest ecosystems at any point in time. Mathematicians have recently discovered that extremely simple — but realistic — deterministic models of nonlinear systems can produce chaotic outcomes indistinguishable from true random noise. Nature is less predictable than Newtonian mechanics would suggest.² Liebniz was wrong when, referring to the uncertainties remaining in Enlightenment theories of Nature, he said "God is not a clumsy watchmaker."

These fault lines in the philosophic basis for forestry have widened into a chasm not easily bridged. Adaptive management seems to make sense, but proponents can cite no successful examples in forestry. Ecosystem management has a euphonious ring, but no one, credible definition can be found. Post-modern society has become so disconnected with Nature that few people really believe the bumper-sticker truism "Everything you own is either farmed, mined or logged." Milk comes from the store.

Practicing foresters — caught in the crossfire as you try simply to do your jobs - cannot stand down and wait for a comprehensive resolution of these dilemmas. At the same time, these fault lines define many of our land-management controversies. For all of us involved in forestry and the modern wood-using industry, a modest positive step is simply to recognize that cutting down a tree creates ethical obligations - an obligation to sustain the forest from which the tree was cut; an obligation to use the wood wisely and efficiently.³ Foresters generally accept these obligations, although we do not describe them as such. Embracing these obligations conspicuously and articulating them as part of the profession might help move us a step closer to a demonstrably sustainable future, and a step closer to strong societal support for the practice of forestry.

You can reach me in person, by letter, fax (604) 822-8645, 2 (604) 822-2467, or by e-mail: binkley@unixg.ubc.ca.

March, 1996

¹This essay is based on some insightful comments by Prof. Bart van der Kamp. He, of course, is not responsible for what is said here, and might even disagree.

² D. B. Botkin. 1990. **Discordant harmonies**. (Oxford University Press: New York) provides a convincing account.

³ Interestingly, this view is consistent with the Shinto belief that "...a carpenter, when he cuts down a tree, incurs a moral debt...[N]ature exacts from man a price for coexistence. A carpenter must put a tree to uses that assure its continued existence, preferably as a thing of beauty to be treasured for centuries." p. 21 in S.A. Brown. 1995. The genius of Japanese carpentry. (Kodansha International: Tokyo).

RESEARCH HIGHLIGHT

Mahogany Logging in Bolivia, Very Profitable, But Is It Sustainable?

TN the Bolivian tropics I am investigat-I ing both the economic returns and the environmental impacts of current and alternative logging practices in collaboration with colleagues at Conservation International in Washington, DC. The former involves highly selective sequential cutting in which all commercial trees of a single species are taken in any given entry. In some forests, mahogany still exists so this species is targeted. Cutting removes around one tree every 5 hectares, or roughly 1 m³/ha. Mahogany regenerates naturally after large, catastrophic disturbances which, in the study area, are caused by severe episodic flooding so current practice will, in all probability, lead to commercial extinction of this species in one cycle. However, the cutting intensity is so light that very little damage results from this approach, at least on a per-hectare basis, and stands remain nearly fully stocked.

Alternative silvicultural prescriptions designed to promote regeneration and the sustainable management of mahogany require retention of seed trees and much more intensive cutting to create bigger openings. Given poor markets for most other commercial species, this means felling trees to waste. The total impact on woody vegetation is much greater from

DEPARTMENT NEWS

The response to the Dean's article in Branch Lines (Vol. 6 No. 3) on the revision of the BSF program triggered a number of thoughtful replies on the matter of what type of a graduate we should be producing. These comments have been most helpful in the continuing program review.

The Department has been active in searching for staff in several areas. We recently completed a search in hydrological engineering and have hired this approach when measured on a per-hectare basis, however, a smaller area is required to supply a manufacturing facility of fixed capacity given the commercial volume cut per-unit area is higher.

A growth and yield model was used to simulate the application of four different silvicultural prescriptions to a sample forest. Prescription 1 represents current practice with a cutting cycle of 5 years, the second is the same with a cutting cycle of 10 years, and 3 and 4 were designed to promote mahogany regeneration by retaining seed trees and cutting more volume per hectare, both with a 10-year cutting cycle. In 4 some trees were felled to waste for lack of markets. Simulations were run for a hypothetical concessionaire with a single sawmill and annual capacity of 8400 m³

Net Present Values for Four Silvicultural Prescriptions ('000 \$US)

Discount		Prescription #		
Rate	1	2	3	4
25%	9,806	6,267	1,600	1,215
20%	11,099	7,417	1,979	1,508
15%	12,804	9,005	2,584	1,980
10%	15,273	11,342	3,685	2,854

(prescriptions 2-4) using a 50-year planning horizon. In prescription 1 annual demand was doubled, but the concession area was kept the same as prescription 2 to explore incentives for adding manufacturing capacity. The model output includes per-unit volume timber yields so the area of productive forest needed to supply the mill could be calculated given the annual demand. The model also predicts logging damage per-unit area which was used to calculate total impact on woody vegetation for the four prescriptions. Net present value was calculated using local cost and price data.

The findings show that economic returns from current practice are much greater than those possible from applying alternatives designed to promote sustainable production of mahogany. These alternative prescriptions also have equal or even greater environmental impact by some measures. These two points raise important questions about the chances for success in encouraging or even forcing concessionaires to adopt intensive forestry, and perhaps more importantly, the wisdom in doing so.

For further information, please contact Dr. Andrew F. Howard, at (604) 822–3794 or e-mail: ahoward@unixg.ubc.ca.

Dr. Younes Alila to fill this position (see New Appointments on page 5). A candidate has been selected for the new position in Conservation Policy. The search for a new faculty member in the area of Forest Operations is in the final stages. There are active searches underway for two joint positions with Landscape Architecture.

The Faculty is co-hosting (with FERIC) the "International Mountain Logging and

Pacific Northwest Skyline Symposium" at Campbell River on May 13–16, 1996.

Dr. Howard ran a week-long intensive project on Vancouver Island for fourth year Operations students. The students stayed at the recently renovated UBC Research Farm and worked on three separate projects in collaboration with the MacMillan Bloedel Menzies Bay division.

Wood Science Department

RESEARCH HIGHLIGHT

Study Shows Sawmill Quality Control Programs Can Be a Good Invesment

QUALITY control (QC) programs seem like an expensive process for mills producing dimension lumber until we realize that not only can the programs enhance product quality to the customer, but they can also help reduce costs by minimizing fibre loss in the milling process.

Typically lumber is sawn oversized in the green stage to allow for the variability in the sawing and drying process. This oversized material is planed off to produce a consistently sized product. Saw kerf sizes are often kept high because sawblades with thicker plates have less vibration to cause poorly sawn surfaces. Both of these practices result in a significant amount of fibre loss. Regular quality control programs can help reduce this process variation by finding and eliminating problems which create the need for deliberate oversizing and excess kerf sizes.

Previously, the benefits of these reductions in oversizing and saw kerf have been difficult to quantify for a sawmill. However, new research at UBC has shown how sawmill simulations can provide cost/ benefit analyses of such QC programs.

A specific sawmill which produces 160 MMBF per year of dimension SPF was analyzed in this study. The experimental procedure consisted of 60 simulations: one simulation for each saw kerf ranging from 0.120" to 0.175" with an increment of 0.005", and for five different lumber target thickness and width sizes with an increment of .010". Each run

DEPARTMENT NEWS

Dr. Simon Ellis visited CSIRO in Melbourne and the New Zealand Forest Research Institute in Rotorua to build on established research links between the two research agencies and UBC. He also visited Buckinghamshire College, UK, in January to upgrade his knowledge and skills in the subject of wood finishing systems for part of a course being



Simulated sawmill revenue as a function of reductions in green lumber target size and saw kerf thickness.

simulated the operation of the sawmill for a one month period (360 hours). All other aspects of the runs were held constant. For each of the simulations, the production results, total mill net revenues and lumber recovery factors were recorded. This information was then used to estimate the impact of changes in kerf and target size on value and volume recovery.

Reductions in target sizes and saw kerfs were found to significantly increase mill revenues from its base revenue of \$800,000 per month. The mill's net revenue was found to increase by \$27,160 per month for every 0.010" reduction in lumber target size, and \$14,810 per month for every 0.010"

offered in the new Wood Products Processing Program.

The Centre for Advanced Wood Processing has hired Tom Wray as Facility Manager.

In December, Dr. John Ruddick and Futong Cui were awarded U.S. Patent 5,476,975 for the extraction of toxic organic contaminants from wood and photodegradation of toxic organic reduction in saw kerf. This demonstrates that reductions in target size have nearly twice as much impact on mill net revenues and recovery than saw kerf reductions. This is particularly true when it is considered that saw kerf reductions often result in larger target sizes.

In practice, many mills have reported green lumber size decreases of 0.040" or more within the first few years of implementing a rigorous statistical process control system. Given these findings, this could result in an annual savings of around \$1,250,000.

For more information or a full copy of this research report please contact Dr. Thomas C. Maness by fax at (604) 822– 9104 or e-mail: maness@unixg.ubc.ca.

contaminants. Bell Canada is investigating the option of developing the process.

Dr. John Ruddick has been elected to a three-year term as President of the International Research Group in Wood Preservation, representing 300+ members from over 35 countries. The Annual Meeting of the IRG will be held at Whistler, B.C., in May next year.

Forest Sciences Department

RESEARCH HIGHLIGHT

Western Gall Rust on Lodgepole Pine: Managing a Natural Pathosystem

X/ESTERN gall rust caused by Endocronartium harknessii is a common and widespread disease of lodgepole pine. There are two good reasons for studying the disease. The first is that damage does occur when gall rust reduces stocking of pine stands to below acceptable limits. In natural stands, this happens infrequently (2-5% of all stands) because most stands are well stocked. Pre-commercial thinning in infected stands presents special problems. There are many examples of stands in which stocking was reduced to minimum levels without removing lethally infected trees. Rather than spend a lot of extra effort removing diseased trees, it is now recommended that stocking targets be amended in affected stands to allow for subsequent rust mortality. Details can be found in For. Chron. 70:773-779.

A second reason for studying gall rust is to elucidate the 'natural balance' between host and pathogen. Many diseases occur as epidemics that lead to infection of all available host tissues. In gall rust this doesn't happen. The highest infection levels observed in the field are well below 1% of host saturation. Yet each gall can produce millions of spores in its lifetime, and if only two of these caused new infections, host saturation would certainly occur. Why doesn't it happen?

DEPARTMENT NEWS

In January, Dr. Gene Namkoong was elected to the Royal Swedish Academy of Agriculture and Forestry.

Dr. Chris Chanway has been appointed Microbial Ecology Section Editor for the Canadian Journal of Microbiology. A recent study, conducted jointly with Peter Blenis (U of A) may shed some light on that question. It turns out that there are several fungal hyperparasites of gall rust. These are fungi that live only on sporulating galls, and



Number of normal (solid) and parasitized (dotted) living galls over time following sanitation.

that stop or greatly reduce rust spore production. Some simple modeling has shown that when rust infection is low, hyperparasites can't spread very well, and infection increases. However as rust infection increases, the hyperparasites spread more efficiently, and eventually an equilibrium is attained at which the rate of new infection is balanced by gall mortality.

All this has some interesting implications for management. For instance the figure shows what could happen if we

sanitized a stand in which gall rust was at equilibrium by removing 90% of all galls. The result is a rapid increase in annual infection to well above equilibrium levels and then a decline to equilibrium. Over the 50 year period following treatment, the total number of galls established can be greater than if nothing had been done! Using the same model, it was also shown that breeding for rust resistance in pine may have little effect in a pathosystem controlled by hyperparasites. In spite of increased resistance the rust will still attain similar equilibrium levels.

The moral of the story: don't be too quick to intervene in natural pathosystems you don't understand: the results may be surprising.

For further information, please contact Dr. Bart van der Kamp at (604) 822-2728 or fax (604) $822-9102.\square$

Dr. Scott Hinch presented a paper (and was co-author on two others) on salmon growth and energetics at the Canadian Conference for Fisheries Research in Montreal in January. He was also part of a team of experts evaluating the responses of the Canadian Department of Fisheries and Oceans to the recommendations made last year by the Honourable John Fraser as part of his Fraser River Public Review Board.

Dr. Yousry El-Kassaby has been appointed as a part-time Professor in the area of Forest Genetics (see New Appointments on page 5).

Faculty News

New Appointments



In February, we appointed **Dr. Younes Alila** to the Forest Resources Management Department as an Assistant Professor in the area of forest engineering hydrology. He obtained his doctorate in engineering hydrology from the University of Ottawa in 1994, and has been working as a project engineer with the Greater Vancouver Regional District.

Younes will initiate a research program in Forest Engineering Hydrology focussing on planning and design of road drainage systems, rainfall and streamflow estimation for the design of

culverts and bridges, and impacts of forest management practices on the overall hydrologic cycle. He will be teaching engineering hydrology and forest watershed management at both graduate and undergraduate levels.

Younes is looking forward to interacting and collaborating with other UBC faculty members, governmental agencies, and forest companies.

Younes can be reached at (604) 822–6058 or e-mail: alila@unixg.ubc.ca.



In January, we appointed **Dr. Yousry El-Kassaby** to the Forest Sciences Department as a part-time Professor in the area of Forest Genetics. Yousry is the Director of Applied Forest Research for Pacific Forest Products Limited. He obtained his doctorate in forest genetics from the University of British Columbia in 1980. Dr. El-Kassaby's area of research interest is population and quantitative genetics. Although Yousry has previously guided genetic students and taught classes at UBC, he will now assume a more active role in teaching and research in his new status.

He will be teaching part of the Forest Genetics course this year and will help develop the Forest Genetics program with the new NSERC/Industry chairs. This appointment is expected to strengthen both Pacific Forest Products Limited and UBC research links.

Yousry can be reached at (604) 652-4023, fax (604) 652-2800 or e-mail: yousry@visual.net.



We recently appointed **Ms. Beverly Bird** as First Nations Curriculum Coordinator. This new initiative is part of the First Nations Forestry and Conservation program that has been developed in the Faculty of Forestry over the past year and a half.

Beverly is a Tl'azt'enne from Tache, B.C., and has a B.A. in Geography from UBC. Her role in the Faculty of Forestry includes the development of a new course "First Nations' perspective on Forest Lands." This course, and the incorporation of First Nations content into existing courses, will be guided by a

committee of forestry professionals from both industry and First Nation communities, First Nations Elders/educators, federal/provincial government representatives, and UBC Faculty of Forestry advisers.

Beverly will also be working with Faculty members towards incorporating First Nations content into their courses. Another task for Beverly will be co-ordinating an international workshop on First Nations forestry education.

Beverly can be reached at (604) 822-4728 or e-mail: bbird@unixg.ubc.ca.

John Worrall Undergraduate Bursary Breaks Records

The John Worrall Undergraduate Bursary was conceived as a project of the 1975-1989 Forestry Alumni to honour John's contributions to forestry education. John Worrall has been contributing to the academic and cultural development of forestry students at UBC for the past 27 years. He is the first faculty member who has been able to tell two generations of undergraduates that forestry really is all about trees (a subject he shares with great passion).

The goal of the 1995 Alumni campaign was to raise sufficient funds to be able to endow an undergraduate bursary in John's name. The response was overwhelming, with 243 alumni making contributions of over \$21,500. This is an increase of 300% over the level of 1994 alumni gift giving. The greatest participation in the 1995 campaign, by way of number of gifts, was made by the class of '84 with 31 alumni participating. The greatest contribution was from the class of '76 who contributed \$5,535. The endowment will provide an annual bursary of \$1,000 for undergraduate student support.

Thank you to all those who contributed and those who volunteered to raise funds for this award. Class Representatives who led the recruitment of volunteers included:

Peter Affleck '75 Doug Routledge '76 Bruce McIntyre '77 Brian Gilfillan '78 Michael Holmes and Doug Bennett '79 Robert Kyle '81 Stirling Angus, John Howe and Susan Craven '82 Candace Parsons '83 Eleanor McWilliams '84 Mark Tamas '85 Chris Ortner '86 Steve Mitchell '87 Larry Clark '89 Fundraising for the John Worrall Under

Fundraising for the John Worrall Undergraduate Bursary was relatively easy and brought back a lot of good memories. We hope the support of this award will become part of a Forestry Alumni tradition to provide opportunities for forestry students in the future.

> Reid Carter, Chair 1995 Alumni Campaign

Centre for Advanced Wood Processing

Opening Gala Event



The Hon. Dan Miller, Deputy Premier and Minister of Employment and Investment, presents the dinner address.

A GRAND celebration was held on March 11 at the Waterfront Centre Hotel in downtown Vancouver to mark the opening of the Faculty of Forestry's new Centre for Advanced Wood Processing, and the Wood Products Processing undergraduate program at UBC. Nearly 200 people from the senior ranks of industry, government, and education from across Canada were on hand for the celebration. In addition, officials from wood processing schools in Germany and Switzerland attended to discuss cooperative agreements with UBC to help design and deliver the new programs.

The new B.Sc. Wood Products Processing Program is an innovative program developed jointly by the Department of Wood Science in the Faculty of Forestry, and the Departments of Mechanical and Electrical Engineering in the Faculty of Applied Science. The interdisciplinary five year program is taught through a group learning approach emphasizing communication and business skills as well as education in advanced computer integrated manufacturing, industrial engineering and wood science. Students in the new cooperative education program will spend 20 months in industry. The new program will be guided by an industry advisory board.

The Centre for Advanced Wood Processing (CAWP) will house an Advanced Wood Processing Laboratory containing state-ofthe-art manufacturing equipment, computer and systems simulation labs, and teaching facilities. The CAWP will support the Wood Products Processing Program by conducting practical laboratories and managing the cooperative education component. In addition, the CAWP has a federally supported mandate to conduct continuing education programs, extension services, and applied research programs to companies across Canada.

This initiative is funded through a combination of redirection of Faculty of Forestry operating budget, a new \$14.5 million endowment (\$8.5 million from Forest Renewal BC and \$6.0 million from the federal government) and \$6.95 million from the provincial government for construction costs of the CAWP.

The grand opening, co-hosted by the Industry's National Education Initiative (NEI), emphasized the development of the program, and the strong role played by the NEI board in creating the new program. A dinner speech by the Hon. Dan Miller, Deputy Premier and Minister of Employment and Investment — an early and very strong supporter of the initiative — highlighted the event. \Box



Department Updates

Enclosed with this issue of Branch Lines is our first *Department* Update.

This inaugural issue was produced by the Malcolm Knapp and Alex Fraser Research Forests. Look for Updates from our departments of Wood Science, Forest Sciences and Forest Resources Management in future mailings of Branch Lines.

Branch Lines is up on the World Wide Web

You can now find copies of **Branch** Lines (and much more information about the Faculty and its activities) at our *World Wide Web* site. The Faculty's new home page address is:

http://www.forestry.ubc.ca/

NEWSLETTER PRODUCTION

Branch Lines is published by the Faculty of Forestry at the University of British Columbia three times each year. ISSN 1181-9936.

http://www.forestry.ubc.ca/

Editor: Susan B. Watts, Ph.D., R.P.F. *In-house typesetting and layout:* Patsy Quay and Susan B. Watts.

Questions concerning the newsletter or requests for mailing list updates, deletions or additions should be directed to Dr. Susan Watts, Newsletter Editor at:

Faculty of Forestry University of British Columbia 270–2357 Main Mall Vancouver, B.C. V6T 1Z4 ☎(604) 822–6316 Fax: (604) 822–8645 E-mail: suwatts@unixg.ubc.ca

©Faculty of Forestry, 1996