FACULTY OF FORESTRY • **NEWSLETTER** • THE UNIVERSITY OF BRITISH COLUMBIA

Branch LINES

Volume 5 No. 1 March 1994

From the Dean's Desk

Universities are places of quiet stagnation, unresponsive to changes in society. Or so media accounts such as the annual **Maclean's** magazine issue on colleges would have you believe. For the UBC Faculty of Forestry, nothing could be further from the truth. The past three years have seen:

- Significant revisions in our undergraduate programs, including an improved forestry curriculum that broadens and deepens the definition of forestry; a wholly new B.Sc. program in Natural Resources Conservation to respond to the growing need for professionals to manage parks and other landscapes where industrial activities are de-emphasized or absent altogether; extensive efforts to make our programs in the key area of forest products and industry more attractive to students and more responsive to employer needs; and a new emphasis on First Nations students (see page 6).
- A large extramural R&D program that places us at the lead of Canadian forestry schools, and as one of the most research-intensive faculties at UBC. With this expanded emphasis on research has come record enrolment of graduate students.
- Record enrolment of undergraduates in 1993/94 with a steadily improving entry GPA.
- A new program of international forestry that brings our faculty and students in closer contact with other universities and research institutes in the Pacific Rim and in other regions of strategic economic and political importance to B.C.
- Improved communications with our external clients — alumni, resource professionals and employers — through **Branch Lines**, our Annual Report, our Forestry Advisory Committee, and regular symposia such as our recent colloquia on the controversies surrounding the Clayoquot Sound decision (p. 2), our workshop "Measuring Biodiversity for Forest Policy and Management" (p. 4), and our second annual Research Day (p. 5).

Faculty and staff have meet the challenges of change with alacrity and enthusiasm. But the environment in which we operate continues to evolve, and with these changes comes the continual need for the Faculty to reformulate its plans. We are now in the midst of doing so.

During March the faculty will consider a draft mid-term plan. The plan articulates a "future history" for the faculty in the form of a prospective 1997 Dean's Report. Once we ourselves have a good sense of our future direction, we will vet the plan with the Faculty Advisory Committee, the university administration, alumni and other key external audiences — in short, many of you who read **Branch Lines**.

This work will direct our efforts for the next three to five years, including allocation of our resources among activities, and our plans for developing external resources to support the faculty. Because of the difficult provincial financial situation, the faculty has suffered tough budgets during the past three years — just at a time when demands on the faculty have increased dramatically and the need to implement new programs is unsurpassed. As a result, we need to find alternative sources of financial support if we wish to meet these demands, to respond affirmatively to changes in society and to maintain our high standards of excellence. To this end, we recently appointed our first Faculty Development Officer, Mr. John Pennant (see page 6). During the next few months, he and I will be calling on many of you to seek your advice on the most critical needs for forestry research and education in British Columbia, and to seek your support so we at the Faculty of Forestry can meet these demands.

Clark S. Binkley

Gardner Honoured

Dr. Joseph Gardner, Dean Emeritus of the Faculty of Forestry, has been appointed a member of the **Order of Canada** in recognition of his outstanding achievements in science.

Dr. Gardner, a fellow of the Chemical Institute of Canada and the International Academy of Science, concentrated his research efforts in the area of wood science and the utilization of various wood products. He served as Dean of the Faculty from 1965 until 1983 and retired from UBC in 1984.

Dr. Gardner has been invited to Rideau Hall in Ottawa on April 13, to receive his award.

Congratulations Joe!

RESEARCH HIGHLIGHT

Spatial Forest Planning in the Revelstoke Timber Supply Area

OVER the past two years, the Faculty of Forestry has been involved in an innovative forest planning project for the Revelstoke Timber Supply Area (TSA). This 500,000-ha TSA is not only important for timber production, but also for recreation, Caribou habitat, domestic watersheds, and scenic beauty. Taking all of these resource concerns into account when planning future harvests proves to be a challenging task. To assist this planning process, the B.C. Forest Service district staff at Revelstoke were searching for methods to forecast harvests so that explicit spatial constraints, such as the adjacency rule, green-up periods, and forest cover constraints would be satisfied. An important objective was to produce maps that would clearly identify the location and timing of future harvests for review by the planning team and the public.

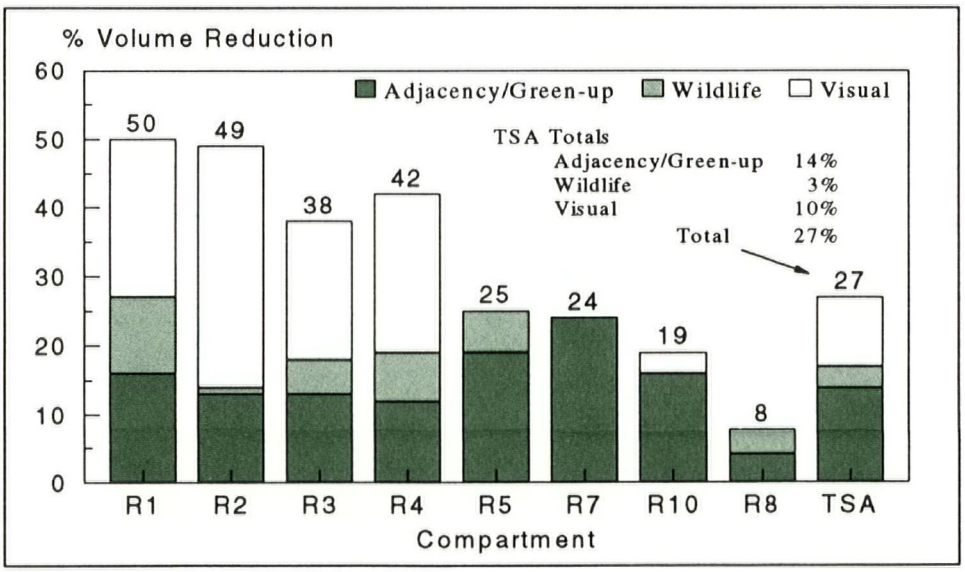
Forest Service staff completed a major inventory of the TSA resources, including the mapping of resource emphasis zones. They also identified and mapped approximately 14,000 potential harvest units, and 18,000 road segments. This information was then forwarded to UBC for the harvest scheduling phase.

The Revelstoke TSA project is the largest spatially constrained harvest scheduling problem that we have yet tackled at UBC. Our major challenges centered around the voluminous data management problem. A computer simulation model, called ATLAS (A Tactical Landscape Analysis System) was developed to handle the Revelstoke TSA forecasting problem. The model is capable of scheduling large numbers of harvest units subject to explicit spatial constraints, and unlike typical harvest scheduling models, the geographic reference of each unit is maintained through time.

One of our first priorities was to quantify the impacts that existing harvesting guidelines have on long-term harvest levels. Three harvesting guidelines were examined: 1) adjacency and green-up, 2) Caribou habitat requirements, and 3) visual quality constraints. The figure shows the percentage reduction in harvests caused by these constraints, relative to a base case where no guidelines were present. Also shown in the figure are the impacts recorded in several sub-units. The impacts vary significantly within these sub-units, creating some interesting challenges regarding the equitable allocation of operating areas among licensees.

The ATLAS model has proven to be a very useful tool for examining forest planning issues, and possible future states of the forest. In other applications, the model has been used to assess the impacts on timber supply and delivered wood costs of the coastal biodiversity guidelines.

For further information, please contact John Nelson at (604) 822–3902 (e-mail nelson@unixg.ubc.ca) or Jim Blake, Revelstoke Forest District at (604) 837–7611.❑



Reductions in long-term harvests associated with common harvesting constraints. Reductions are shown for several sub-units of the TSA, and for the TSA as a whole.

DEPARTMENT NEWS

On Saturday, January 29, Dean Clark Binkley moderated a forum on the "Conflicts in the Clayoquot: A Comprehensive Analysis." This day-long free public forum was sponsored by the UBC Faculties of Law and Forestry together with Continuing Studies and the Students for Forestry Awareness. Close to 200 people attended this very stimulating event.

In February, Dr. Peter Pearse gave the keynote address at the National Management Seminar of the Canadian Water and Wastewater Association in Calgary, Alberta. The title of his talk was "Development of Federal Waste Water Policy: One step forward, two steps back."

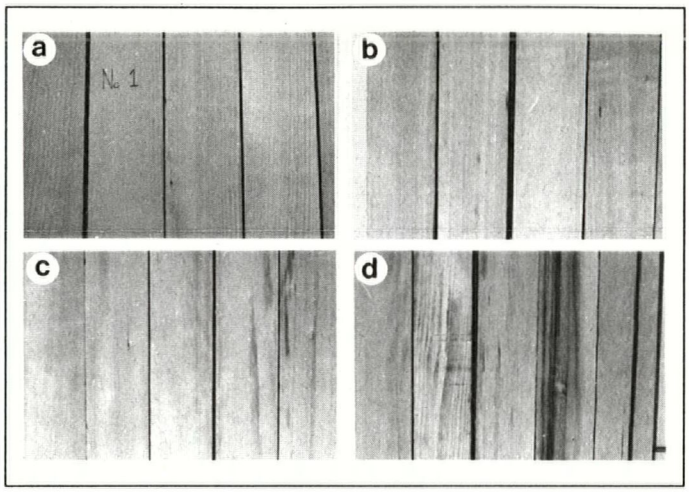
Dean Clark Binkley has recently presented papers to the IVMA in Prince George — "Gilgamesh and the land ethic: The case for intensive forestry in B.C.," and to the BCFA in Williams Lake — "Multiple use through intensive management."❑

RESEARCH HIGHLIGHT

Alleviation of Brown Stain in Hem-Fir Lumber Through Manipulation of Drying Schedules

A BROWN stain often develops when kiln drying hem-fir [western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) and amabilis fir (*Abies amabilis* (Dougl.) Forbes)] lumber, leaving the wood with an unsightly appearance, greatly reducing its value. The formation of the stain is believed to be most likely a two-stage phenomenon involving oxidative enzymatic reactions of wood extractives followed by condensation of the products of these enzymatic reactions upon drying to form darkly coloured compounds. Since the stain is most apparent after lumber has been kiln dried, a logical approach to reduce the incidence of brown stain is to modify the drying process. A recently completed study funded by the Science Council of British Columbia investigated the effects of some drying variables on the development of brown stain in hem-fir lumber.

Green lumber from a source which has proven to be especially susceptible to stain development was kiln dried using various pre-steaming treatments in an attempt to remove some of the wood extractives. Preliminary laboratory experiments were performed and then kiln drying trials were carried out using a regular industry drying schedule and a more mild experimental drying schedule, together with three pre-steaming treatments (0, 12 and 24 hours). The dried lumber was visually assessed in terms of the occurrence and intensity of brown stain.



Examples of different appearance grades used to assess dried lumber, (a) highest grade (d) lowest grade.

The main conclusions drawn from the study were:

- Higher levels of catechin (a wood extractive) in small wood samples led to darker coloured wood after oven drying.
- Lower drying temperatures resulted in less stain development.
- High relative humidities throughout the drying period tended to produce more stain.
- More gradual drying led to less stain development.
- The highest quality visual appearance lumber resulted from the mild schedule with no pre-steaming and the regular schedule with 12 hours of pre-steaming.
- The 24-hour pre-steaming treatment produced lumber with the worst appearance under both drying schedules.

A proposed future project will further investigate the effects of the pre-steaming treatments together with the use of high air velocities in the kiln with the aim of developing kiln schedules that will minimize brown stain formation while drying the wood in a realistic time frame.

For further information, please contact Dr. Simon Ellis at (604) 822–3551 or Dr. Stavros Avramidis at (604) 822–6153. Fax (604) 822–9104.❑

DEPARTMENT NEWS

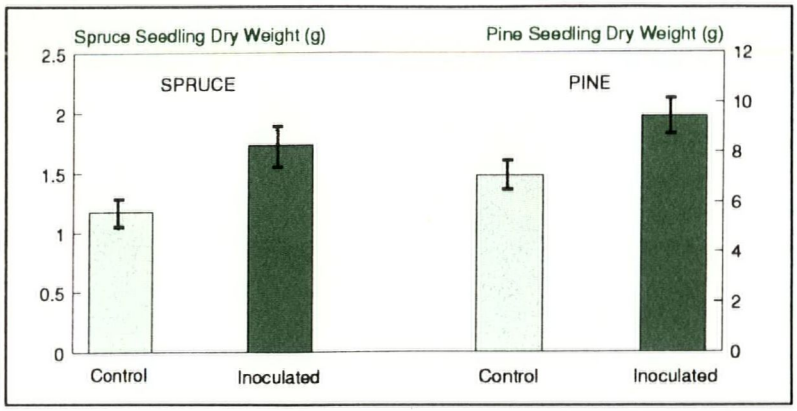
An industry committee, chaired by Dr. Ian de la Roche of Forintek, is leading an in-depth review of the Department's undergraduate forest products/wood science programs. Over the next 6 months, these programs will be re-engineered to provide graduates with the knowledge and skills needed in the primary, secondary and tertiary sectors of the forest products industry. Industry advice has been sought through a survey and focus group discussions to be completed in March 1994. We are seeking additional advice from all groups interested in the future direction of wood science/forest products education at UBC. We would be pleased to forward copies of our two page survey which can be completed in 15 minutes and returned by fax. Alternatively, Dr. Dave Barrett would be pleased to receive your phone calls at (604) 822–5303, or your letters or e-mail (dbarrett@unixg.ubc.ca).❑

RESEARCH HIGHLIGHT

Plant Growth-Promoting Rhizobacteria (PGPR) for Conifer Seedlings

EFFICIENT and cost-effective reforestation of cut-over sites is a fundamental tenet of sound forest management. To this end, over 200 million seedlings are planted annually in B.C. However, seedling survival and growth rates can be unacceptably low during the initial years after outplanting, especially at poorer quality outplanting sites. A variety of factors contribute to seedling success in the field but the capacity for rapid and vigorous root growth soon after outplanting is essential. In addition, planting check (i.e., restricted shoot growth after planting) is common particularly in white spruce and associated hybrids, and can result in overtopping by competing vegetation. Mechanical site preparation, fertilization, and control of non-crop vegetation can improve plantation performance, but associated costs are substantial.

An inexpensive, environmentally benign alternative for enhancing productivity of newly established plantations involves seedling inoculation with root-associated growth-stimulating microorganisms. In forestry, this practice has generally been restricted to inoculation with mycorrhizal fungi. However, in nature, root systems and associated rhizosphere soil (i.e., soil influenced by the metabolism of plant roots) are also colonized heavily by soil bacteria with up to one billion bacterial colony forming units per gram of root tissue. Root-associated bacteria that stimulate seedling growth through mechanisms such as biocontrol of plant growth-inhibiting microbes or production of plant growth-promoting substances have been called plant growth-promoting rhizobacteria (PGPR). PGPR inoculation of seedlings before outplanting would be an inexpensive (ca. $0.01/seedling) and easily-applied nursery treatment, which could be a useful, cost-effective silvicultural tool. However the utility of PGPR inoculation in forest regeneration has not been explored. We have repeatedly observed conifer seedling growth enhancement in response to PGPR inoculation under controlled environments. In recent field trials, PGPR-inoculated lodgepole pine and interior spruce seedlings had up to 47% more biomass than uninoculated controls one year after planting (see bar graph). PGPR were most effective at the poorest quality outplanting sites, and for spruce, root growth was stimulated over shoot growth.



Seedling dry weight one year after outplanting near Gavin Lake, B.C.; inoculation effects were statistically significant.

In addition, we have recently demonstrated that internal root tissues of naturally-regenerating conifer seedlings are also colonized heavily by bacteria, yet almost nothing is known about these root endophytes. Consequently, we are continuing to evaluate the diversity, ecophysiology, and effectiveness of conifer seedling rhizosphere and root-endophytic PGPR in relation to their role in forest regeneration and possible utility as a silvicultural tool.

For further information, please contact Dr. Chris Chanway at (604) 822–6019 or fax (604) 822–5744.❑

DEPARTMENT NEWS

Dr. John McLean traveled to Maui in February to present a paper at the IUFRO Working Party on Integrated control of Scolytid beetles. His paper was entitled "Evaluation of the gains from the 1990-92 Ambrosia Beetle Task Force in BC."

Drs. Gordon Weetman and Hamish Kimmins made presentations at the public forum on the "Conflict in the Clayoqout" on UBC campus at the end of January (see page 2). Dr. Kimmins also gave a presentation to the European Parliamentarians meeting in Vancouver on "The state of BC Forestry" and a luncheon speech to the ABCPF in Duncan on "Responsibilities of the Professional Forester."

Dr. Robert Guy organized the joint meeting of the Canadian Society for Plant Physiologists and the University of Victoria Forest and Tree Research Colloquium at the Faculty of Forestry, UBC on February 17-18.

Dr. Phil Burton spoke at a recent IVMA workshop on "Integrated vegetation management: Options and applications."

The Centre for Applied Conservation Biology recently completed an intensive workshop on "Measuring Biodiversity for Forest Policy and Management." Further details on this activity will appear in the next issue of **Branch Lines**.❑

Opportunities for Cooperative R & D

THE Natural Sciences and Engineering Research Council of Canada (NSERC) recently laid out a new policy for forestry related research. They will now consider government departments, ministries or agencies involved in forest management or forest management R&D as eligible partners in the Research Partnerships program. The required cash funding ratios are: provincial government not more than 25%, industry (or other private sources) at least 25%, and NSERC no more than 50% of total project costs. Thus each dollar provided by industry that is matched by $1 from the provincial ministry can be matched by $2 from NSERC. It takes time to bring such a plan together. At the moment, no-one has taken advantage of this opportunity.

NSERC also promotes cooperative research and development activities between universities and industry through two other initiatives — Collaborative Research and Development (CRD) grants and Industrially Oriented Research (IOR) Grants.

CRD grants support well-defined research projects carried out jointly by the university and the company over a one to three year time frame. They require a close working relationship between the collaborators. Specific research goals need to be met in a specified time frame. Detailed planning and sound budget justification is required. CRD grants require a cash contribution from the collaborating company. In-kind contributions are welcome but are not matched by NSERC. The NSERC contribution is related to the cash contribution made by the industrial partner. Currently we have three projects funded under this program.

IOR grants are more appropriate when the company wants to enhance or lay the foundation for closer interaction with a university researcher, or support the training of research personnel in your area. These research projects may be mostly exploratory and part of a research program rather than a distinct project. In the IOR program, cash contributions by companies are matched by NSERC. We have one project funded in this manner.

If your company has a suggestion for research and is looking for academic input as well as eager graduate students to carry out a project, contact the Faculty of Forestry at UBC.

For further information, or for help in contacting the professor most closely related to your interest area, contact Dr. John McLean, Associate Dean, Graduate Studies and Research, at (604) 822–3360; fax (604) 822–8645.❑

Upcoming...

Schaffer Lecture and Faculty Research Evening

This year's Schaffer Lecture will be given by Dr. Jeffery Burley, CBE, Director of the Oxford Forestry Institute at Oxford University in the UK, on Wednesday April 6. His topic will be ***"World Forestry: The Professional Scientific Challenges"*** The lecture will be followed by an evening of poster presentations highlighting current research activities in the Faculty of Forestry.

If you are interested in attending this joint event and have not yet received an invitation, please call (604) 822–2507 to have your name added to the mailing list.

Update...

International Forestry Programs

The Faculty has been named as one of the leading UBC units, along with Medicine and Agriculture, in a co-operative proposal to the Canadian International Development Agency (CIDA) for training and research in the border regions of China. Successful proposals will receive five years of funding beginning in 1995 for a variety of activities including graduate education, workshops in China, and applied research projects

Eight mid-level managers and researchers from China are currently studying with various Professors on campus for a period of 6 months. This training program represents part of obligations in a cooperative project with Sandwell Inc. funded by the Asian Development Bank.

As part of the Faculty strategic planning exercise currently underway, Dr. Howard, has prepared an "options paper" for international programs in forestry. The document is meant to assist the Faculty in identifying opportunities and deciding on focus in the international arena.

The Faculty has submitted a dossier to the Mexican organization known as CONACYT which provides Mexican graduate students full funding when they attend any officially recognized program. The dossier contains documentation of all of our graduate-level programs and the qualifications of our staff. We are confident CONACYT will view our submission favourably, after which we can look forward to an additional source of high-quality, fully-funded graduate students. The contacts these students will bring will serve to open the door for identifying premier research organizations in Mexico with which the faculty of forestry can establish formal ties.

For further information, please contact Dr. Andrew Howard, Director of International Forestry Programs, at (604) 822–3794.❑

FOREST NEWS
from the Malcolm Knapp Research Forest

Winter Highlights

DECEMBER wind storms at the Research Forest created sufficient blowdown for about 500 cubic metres of timber to be salvaged and removed. The salvage operations are now complete.

January activity at the Forest included a two week location by a film crew shooting a scene involving a very large western redcedar stump, a 700 pound Alaska bear, a small boy and a yellow dog. The bear was removed from the Forest at the end of the filming!

During the past two years there has been a change in the way the harvesting program is administered at the Forest. Harvesting is now done on a periodic basis of 3 to five years, rather than annually. This approach allows harvesting to be more cost effective and to better reflect market needs.

The majority of the roads required for the next harvesting have now been completed. For the next twenty years or so, much of the Forest's harvesting will be carried out in areas that were railway harvested in the 1920's. Access to these sites will include the use of old railway grades, which although of gentle gradient, often need sub-grade restructuring. A recent road cut on one of the approach roads to the new bridge over the North Alouette River provided an excellent source of fill for much of this winter's road construction. Nearly two kilometres of new (old railway) roads were built, in part, from the fill provided by the 400 cubic metres of road cut material. This work is part of the Forest's 15 year Development Plan.

One of last year's harvesting settings has been prepared for a broadcast burn. Dr. Mike Feller has involved his students in the 7 hectare burn plan, and if all goes well, the burn will take place during Spring Camp in early May. Very little broadcast burning has been done at the Forest in recent years and this project should serve some useful research and education functions.

For further information on the Research Forest, contact Peter Sanders, Resident Silviculturist, at (604) 463–8148.❑

NEW POSITION

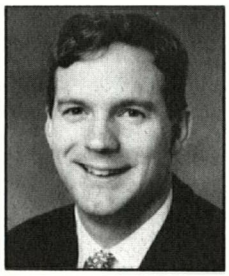
First Nations Coordinator

We have recently received funding for the newly created position of First Nations Forest Resources Management and Natural Resources Conservation Coordinator. This is the first such position in Canada and probably only the second in all of North America. We thank the Vancouver Foundation and the B.C. Ministry of Forests for their three-year commitment of financial support. The Coordinator will develop and implement an extensive program of awareness and recruitment designed to facilitate the entry of First Nations students into programs at the UBC Faculty of Forestry and other related post-secondary education programs in B.C. This new position will assist interested students in preparing for and entering natural resource management programs.

For more information, contact Donna Goss, Coordinator of Student Services, at (604) 822–2727, fax (604) 822–8645.

NEW APPOINTMENT

Faculty Development Officer



JOHN PENNANT has been appointed to the newly created position of Faculty Development Officer to assist with raising financial resources needed for the Faculty's programs.

John graduated with a B.A. in History from UBC and comes to us with fundraising experience from the Liberal party of Canada and consulting firm Ketchum Canada, where he directed campaigns for the Canadian National Institute for the Blind and Kingston Hospitals.

The UBC Development Office recently decentralized it's fundraising organization following the successful World of Opportunity Campaign that raised $262 million. John will work closely with the Dean, Faculty members, Alumni and the Faculty's Advisory Committee in establishing priorities, planning our development efforts, identifying and soliciting financial support and building and maintaining relationships with our supporters.

If you have any questions or would like to get involved in the development program please call John Pennant at (604) 822–8716.❑

NEWSLETTER PRODUCTION

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