The Doug Little Memorial Lecture

Distinctly Canadian silviculture and forest management

by Gordon Weetman[1]

In contrast to most other countries, Canada uses a leasing system for provincial Crown forests. It is unlikely this will change. Canadian forestry has been characterized by a struggle between landlord and tenant over the silviculture and forest management obligations of the tenant and the right of citizens as owners of the forest resource to know what is going on. Forest companies do not have equity in timber and are reluctant to invest in long-term management. Also, Canada is characterized by a broad band of boreal forest across the country with remarkable little contact between the provinces on forest management. Add to this new drivers for change due to customer demands for certification, and the practice of sustainable forest management and notions and concepts from conservation biology, particularly about emulation of historical disturbance. The reality of the present situation is that the price of access to Crown timber that costs nothing to grow is becoming more complex and expensive as demands for better inventories and monitoring increase.

Canadian forestry is becoming more rigorous and accountable and under much more NGO scrutiny. Professional foresters have to be accountable, up-to-date, and behave like professionals. The challenges today are outlined for this new complex situation.

Au contraire de la plupart des pays, le Canada utilise un système de location des forêts publiques provinciales. Il est peu probable que cette situation change. La foresterie canadienne a été caractérisée par un combat entre le propriétaire et ses locataires pour ce qui est des obligations des locataires en matière de sylviculture et d'aménagement forestier et le droit des citoyens en tant que propriétaires des ressources forestières de savoir ce qui se passe. Les compagnies forestières ne détiennent pas la matière ligneuse et sont hésitantes à investir dans l'aménagement à long terme. De plus, le Canada se démarque par sa large bande de forêts boréales d'un bout à l'autres du pays et par le peu de contacts entre les provinces en matière d'aménagement forestier. Ajoutez à cela les nouveaux incitatifs de changement découlant des demandes des consommateurs pour la certification, la pratique de l'aménagement forestier durable et les notions et les concepts de biologie de la conservation, en particulier l'émulation des perturbations historiques. La réalité entourant la situation actuelle est que le prix à payer pour avoir accès à la matière ligneuse publique qui ne coûte rien à faire pousser, devient de plus en plus complexe et dispendieux à mesure que s'accroissent les demandes pour de meilleurs inventaires et une surveillance adéquate.

Twenty-two unique challenges for Canadian silviculture and forest management:

1. A situation of Crown land dominance in Canada: 96% public commercial forests with "ecosystem management" as a land use ethic that now makes non-timber "values" very important or permanent. We have moved from sustained yield management to sustainable forest management (SFM). Management objectives are much more complex today.
2. A landlord/lessee situation; nearly all commercial forest lands are leased out — who does what in Canada? This situation is not seen in the U.S.
3. A continual search for ways to get the tenant to recognize non-timber values and do renewal and tending without having any asset value in the forest except for the annual allowable cut. Incentives are needed — the provinces have tried all sorts of approaches.
4. Policies that ensure that timber must be processed locally and not be exported; we sacrifice revenue for social objectives.
5. The challenge of how to harvest wild, naturally regenerated forests that cost nothing to grow (real wealth) and come to an accommodation with aboriginal owners.
6. A search for ways to arrange management actions in huge-forested landscapes, of

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1) protection: fire, insects, disease, biodiversity, habitat, special places
2) harvesting: rate, location, schedule, and methods
3) silviculture: renewal and tending in a spatially explicit way in a long-term forest management regime that is approved by the public and is designed to produce a DFF (desired future forest) 50 to 100 years from now — this is the new Sustainable Forest Management paradigm, complex to do and rarely seen.

7. A search for ways to keep enough of the money generated by timber harvest to pay for all the management costs — this is quite easy in BC where revenues are high, but very tough in boreal forests where revenues are very low and silviculture expenditures are low.
8. A search for ways to stop, or regulate, the loss of timber revenues which flow into the hands of politicians or interest groups who spend the money on non-forest, politically expedient ways. The latest trend is to put money into trust accounts. In BC we have Forest Renewal BC (FRBC) with the auditor general criticizing their allocation of funds.

[1]Professor Emeritus, Department of Forest Sciences, University of British Columbia, Vancouver, BC V6T 1Z4.

9. A search for ways to determine the growth and yield of vast forest areas for which there are fewer long-term records available; we are forced into computer simulation to project cutover yields and answer "what if" questions about silviculture. BC leads the way with TASS.
10. A search for understanding how the big disturbance agents — mainly insects and fire — actually operate in the landscape in time, space and predictability. This is also part of the new SFM paradigm to "emulate nature" seen all across Canada.
11. A struggle between "man" and "nature" over harvesting. Can humans substitute regulated harvests in some way as a substitute for insects and fire to gain some form of control over forested landscapes? The annual cut is about one million cubic meters per year, but fire and insects may harvest up to three million in any one year. Forest level modelling has been helpful.
12. A long struggle to find the pattern and sense in the distribution of forests across huge natural landscapes so information about the effects of actions can be portable across the landscape.
    Canada has developed a unique approach to site classification using edatopic grids, ecological regions, and site associations. This has been possible since the natural arrangement of trees across sites is still in place. Also, Canada is too vast to map forest soils at operational scales. It has been a big achievement to finally understand and document our forest site associations, or ecosites. Our approach is quite unlike the U.S. approach.
13. A struggle to document and understand the distribution of habitats and the successional trends on the range of forest sites following disturbance. We have far to go; this work is just getting underway.
14. A search for a way to plan and conduct the management of large area-based tenures in the boreal forest in a cost-effective way. Mechanization and long-distance trucking constantly push the economic margin further north.
15. An interesting and unique challenge to engage in "geriatric silviculture," i.e., find new and unprecedented ways to harvest, renew and tend huge areas of old natural forests and provide for a continuous supply of old growth. We will be cutting such stands for many more decades to come. This is a uniquely Canadian situation. Most old growth in the U.S. is now tied up. This is a really big challenge for silviculturists, especially here in BC with decades of old forest harvesting ahead of us.

    Just what is a silviculturist?

    What about silviculture and the silviculturist? — a U.S. viewpoint that equally applies to Canada. David W. Smith (1993) suggests:

    "A silviculturist is not a very definable entity. He or she generally did not start out with the idea of being a silviculturist. Silviculturists tend to originate from one of an array of more basic disciplines such as forest management, tree physiology, genetics, tree improvement, forest soils, forest ecology, hydrology, and so on. For a number of reasons and with professional field experience, they sought the position/title of silviculturist. A silviculturist must be first be an ecologist, and second be a generalist in many aspects of forest management including policy, economics, entomology, pathology, biometrics, fire management, wildlife management, fisheries management, and outdoor recreation. In addition, skills or experience in planning, personnel management, arbitration, sociology, and psychology certainly are helpful. Above all, the silviculturist must be a communicator. The process of becoming a silviculturist requires (1) a thorough understanding of ecological concepts and principles across a range of ecosystems; (2) a comprehensive knowledge of the silvical characteristics of all tree species encountered; (3) a mastery of the research that deals with tree and forest responses to disturbance; (4) a history of lengthy discussions and dialogues about silviculture issues and forest stand dynamics with colleagues and clients from many places; (5) a thorough understanding of the potential values and uses that are, or may be, available within the forest systems in question; and (6) a full awareness of the economic, social, and political implications and constraints that are in force at a particular place and time."

    During the 14 year history of Silviculture Institute of BC, 225 registered professional foresters have taken the advanced modules of silviculture education and received UBC diplomas. We are building silviculture competence in BC.
16. A challenge to convince urban people, environmental groups, NGOs and off-shore customers that forms of clearcutting in old natural forests are sustainable and that they meet the criteria of sustainable forest management. There is a challenge to modify silviculture systems. There are three approaches possible: detective, experimental, and adaptive management (Fig. 1).
17. A challenge to use the new computer and other technologies to collect, store and use inventory information in management systems (e.g., ISO 14 000). If Canadian Tire, Sears and Safeway can track every item in the store, then so can foresters track each inventory polygon.
18. A challenge to use new computer technologists to do cost-effective inventories, monitor performance and produce visual and spatially-based scenarios on what the future forest will look like (e.g., McGregor Model Forest).
19. A struggle to find ways for the landlord, the lessee and the public stakeholders to work together to produce long-term forest management plans. Timber Supply Areas in BC have no such plans — an almost unique situation in Canada. Most of the commercial forest area of BC has no formal long-term strategic forest management plans.

The Doug Little Memorial Lecture

The Doug Little Memorial Lecture series was initiated by the Faculty of Natural Resources and Environmental Studies at the University of Northern British Columbia (UNBC) in 1996. This annual event commemorates the late J.D. Little, former Senior Vice-President of Forest Operations, Northwood Pulp and Timber Limited. Doug was a founding supporter of UNBC and a recipient in 1986 of the Distinguished Forester Award from the Association of British Columbia Professional Foresters. Doug Little believed that with appropriate forest management, the resources of the forest could be sustained for future generations. That philosophy is the central theme of this lecture series, supported by an endowment from Northwood Pulp and Timber Limited.

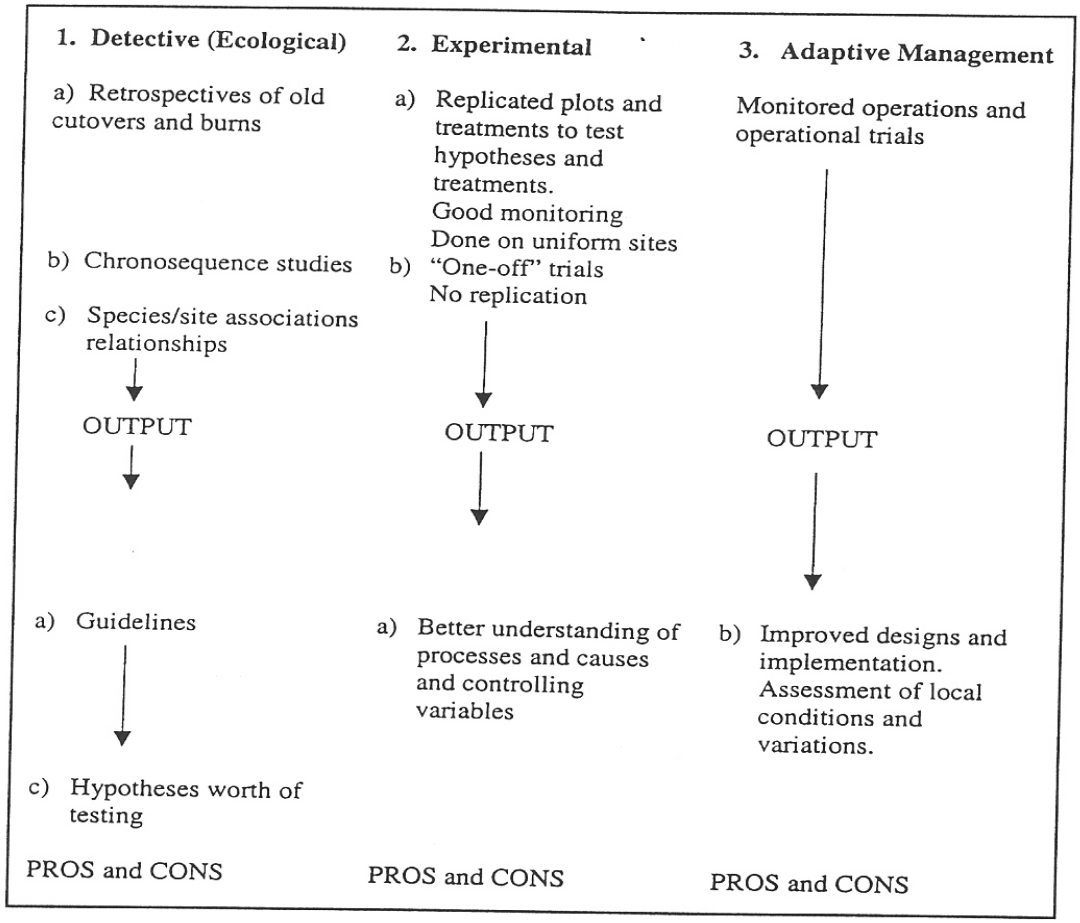

Fig. 1. Geriatric Silviculture: Approaches to modifying silviculture systems in old natural publically-owned forests

20. A struggle over who will manage the forests and be accountable for their actions, i.e., sign off on silviculture prescriptions and management plans. Unlike the US, foresters in BC, and now Ontario and Quebec, have right to both title and practice. They are responsible for "forestry" on Crown lands, but they must be competent, up-to-date, subject to inspection and accountable. Foresters have just had to smarten up and be professional and accountable — all 7000 to 8000 of them across Canada. It is interesting that Ontario has just agreed to give right to practice to foresters.
21. A struggle with the US over our ability, and good fortune, to harvest natural forests with no growing cost, and deliver high quality products into their home market in a very cost-competitive way. Countervailing tariff issues will not go away.
22. A struggle over politicization and control of forestry on Crown lands: here are some personal views — there is a struggle between provincial forest bureaucracies and their political ministers over control and decision making and the use of regulation. There is a struggle to make the management decisions about forests conform to a professionally prepared and publicly approved long-term management plan rather than having decisions made from the ministers, the deputy minister, by regulation books, or even the Premier's desk. The struggle to have advice on policy issues about forests comes both from the people, who own the forest, using political process or land use zoning processes, and from professional and scientific advisory councils. There has been a long and unfortunate tradition of tenure representatives going to provincial capitals to have chats with the Minister to straighten out local problems. MLAs give directives to government managers on local forest management decisions. The trend is to vest more decision making in the people via cooperative planning and to rely on professional forest competence and accountability.

Government controls

The concept of a proud and professionally competent forestry civil service, largely free of political interference, actually managing (rather than administering) Crown forests is a concept that has used the US Forest Service model for organizations like the BC Ministry of Forests. This concept or model for provincial forest management is almost gone, with its last vestiges is in BC where the Chief Forester makes annual allowable cut decisions free of political interference. That is a very good policy! The current Canadian trend is to grant area-based tenure to industry and expect the tenure holders to prepare SFM plans. Almost all of the Canadian Crown commercial forest is under some form of area tenure except BC. Alberta and Ontario have both gotten out of forest management business; tenure holders are expected to prepare long-term plans in cooperation with government. BC seems to be stuck in the

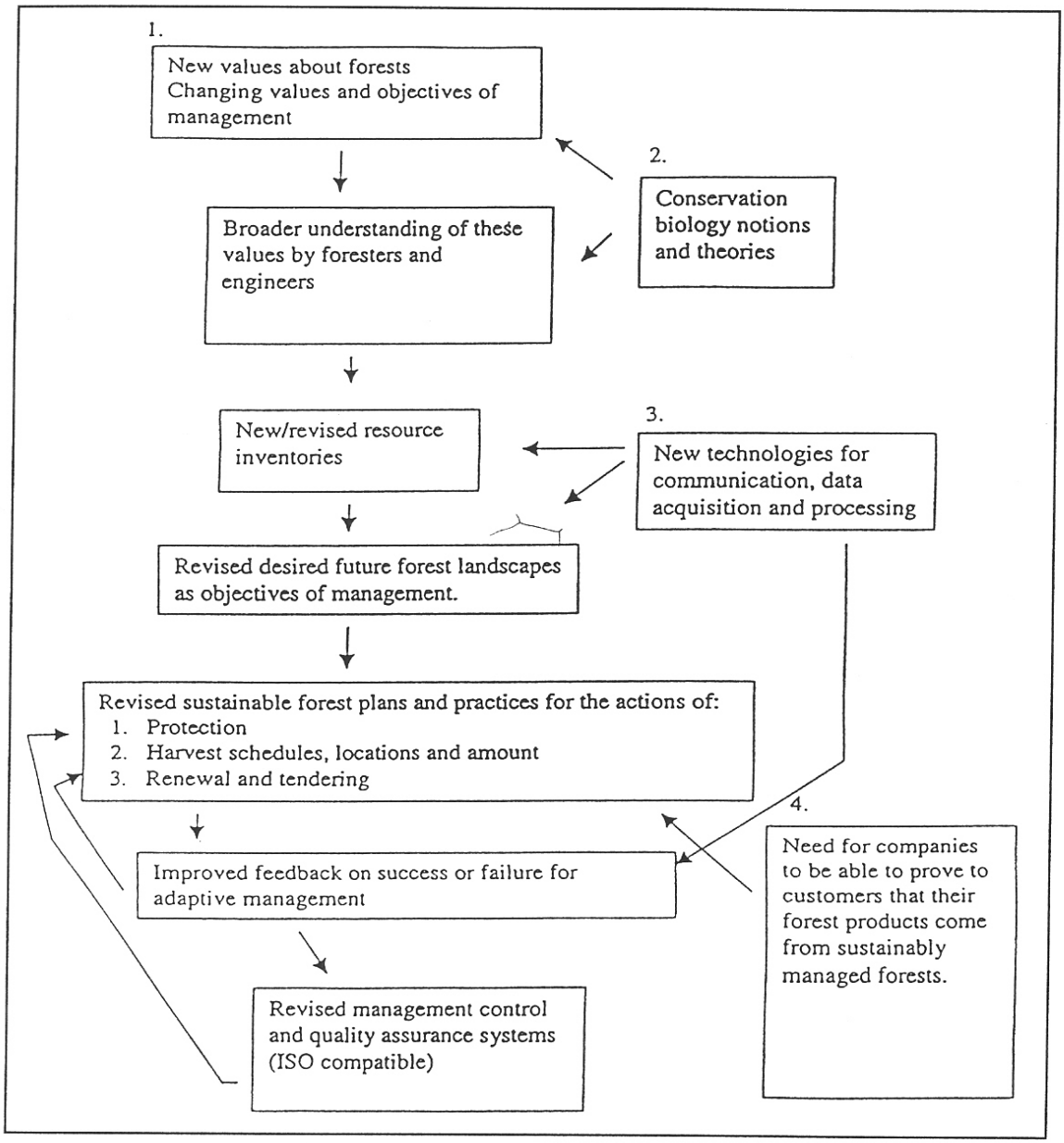

Fig. 2. Four drivers for change in forest management planning that influence allowable cut choices.

past on most Crown forest-licence land without any forest management plans, without area-based tenures, without policy advice from independent councils. British Columbia has some heavy political controls on the BC Ministry of Forests. They attempt to be managers of timber supply areas, with no spatial long-term plans to meet the future forest condition and not enough staff and budget and freedom to do so. This is not a healthy situation — change is clearly needed but seems impossible to institute. We are frozen in an institutional arrangement that does not function well, and does not follow the "Canadian Model" of area-based tenures. In addition, there is the Forest Practices Code — an attempt by a lawyer to legislate stand level practices by 700 sets of regulations and 3000 sets of guidelines, with the innocent assumptions that this will produce Sustainable Forest Management. Baskerville (1998) has suggested that

"Our society has come to rely heavily on regulations as the solution to all manner of problems. I believe it is impossible to manage a forest by means of regulations. At best, regulations insure a uniform approach, but the problems of forest management are not uniform. Regulations are incredibly short-sighted, specifying immediate steps and penalties for not taking the immediate steps. Regulations give the illusion of getting it done on paper, but a restrictive mentality is not consistent with accomplishing management across a whole forest, over a whole rotation. Good management will result from strongly motivated professionalism, not from following rules. An ounce of prevention is more powerful than a ton of regulatory threat. The best way to motivate folks to manage better is to provide a rigorous measure of management effectiveness."

The Forest Practices Board audits do not determine whether a forest is well managed according to Baskerville's criteria for good management — that is, specified benefits or values identified in time and space across a defined forest. Canadian Standards Association certification does attempt to do this.

Many years ago I read an article titled "Canadian Forest Policies are Wrong." It was written in 1926, indicative of the long struggle over forest policy. Perhaps it is sheer size and economic importance of the BC forest economy with so many players, communities, jobs and money involved that makes it so hard to change. The lesser economic importance of forests is perhaps why oil-dominated Alberta and industry-dominated Ontario have been able to adapt while BC has not. Evolution of forest policy on provincial Crown lands has been continuous in Canada as the new "values" associated with public forests have changed. Leopold's Land Use Ethic and the Tragedy of the Commons have evolved into ecosystem management.

To quote Baskerville from 1988:

> "There is a general failure to build a logically consistent linkage from the policy level, through the management level, up to the implementation level in the forest. These three levels are commonly constructed independently, usually by different people using inconsistent databases. I have never seen a situation where a measurable link existed from the policy level all the way up to the level of implementation in the forest. They may exist, but I have not had the exquisite pleasure of reading such a statement anywhere in Canada. The independence of policy design from management, and of both of these from the realities of implementation in the forest, has been devastating to public expectations with respect to the outcome of forest management *in the forest*."

It is singularly appropriate that to help overcome the problem it is here in Prince George that one of the latest and most exciting technical developments in Sustainable Forest Management landscape scenario planning with the McGregor Model Forest have been pioneered. The new technical ability to grow future landscapes on computers and see them on maps and in movie files, greatly enables the production of SFM spatially-based long-term forest management plans that accommodate the values people want, and intensive management and produce an ACC with harvests located in space and time. I hold hope these technologies in IFPAs point the way to the future in BC forestry to eventually get long-term forest management plans prepared for TSAs that set specific and implementable management objectives (Bourgeois 2000). Hopefully, plans should tackle AAC constraints and uncertainties identified by the Chief Forester. Also, it should help direct FRBC funding into a truly auditable and rational way to use all this stumpage tax revenue. We have to get away from politically oriented, stand-level expenditures and to schedule and design actions that relate to long-term landscape-level objectives.

I do not have answers, easy or otherwise, on how to meet all these challenges and struggles. Nearly all of them are uniquely Canadian by their nature and circumstances. We have to manage vast forests in public ownership in the public interest.

Why we should do this, how we should do it and the ethical, moral and ecological rationales for doing it are always being challenged.

The big drivers for change are:

1) conservation biology ideas and notions that change the objectives of management.
2) demands by our customers for forest products from sustainably managed forests — thus certification.
3) new technologies to do the job — especially information storage and scenario planning.
4) new values about forests — mainly ecological and ethical.

Forestry is becoming more interesting, much more specialized, even better paid. For students of forestry the future is very bright and attractive — or should be.

Forestry originated in central Europe by sheer force of circumstance. It was a priority for nation states to rebuild their shattered and destroyed forests in the 1700s. This is what we call "restoration ecology" today. The foresters met the challenge and did stop highgrading and restored the forests — a proud tradition of silviculture.

In Canada we have the privileged opportunity, especially in BC, to find sustainable ways to manage the finest piece of natural forested landscape in the world that is still largely undisturbed by man and very valuable — a truly unique and interesting job for foresters. We have the revenue from the natural stands to pay for protection, renewal and management. In BC that is about a $10 000/ha cut — lots of money!

Like Professor Fred Bunnell has said. "It ain't rocket science — it is much more complicated." I think foresters are up to the task, provided of course that they take a good university forestry course, keep up-to-date by more study, and remain professionally competent and accountable for their actions.

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