

Canada's quest for forest sustainability: Options, obstacles and opportunities

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Background

About 10 years ago, the concept of sustainable development became popular on the world stage through the report of the United Nations Brundtland Commission. The logic behind the concept was difficult to refute, and indeed Canada's forestry sector seemed to be generally comfortable with the term. Part of the reason for this was that several generations of Canadian foresters had recognized the economic, social and environmental values of forests. Some foresters believed strongly that the forest landscape could support a variety of human uses without destroying the integrity of the forest. One of these was Doug Little, who put the idea in the language of the operational manager: "I believe the forests can be harvested in harmony with nature, its wealth shared and replaced with one that is at least as good, one that would thrive." I never had the opportunity to meet Doug Little, but I can tell from reading and hearing about him that he would have been quite comfortable with the concept of sustainable forestry; indeed, he probably would have been one of the leaders in converting the concept into reality.

The timing was right for the concept to appear. It was a time when we could see increasing evidence that the combination of exponentially growing human populations and the voracious consumerism of the developed world was putting intolerable pressure on the planet Earth. Canada was quick to embrace the concept of sustainable development, and our forestry sector was one of the first to incorporate the principles of sustainability into our strategies and policies. To many, the challenge seemed straightforward: define sustainable forestry, draft the appropriate legislation and policies, revise our planning and management processes, modify our forest operations, and bingo, we'll have sustainable forestry. Well, it's not so simple! Some of you may know Joe O'Neill, Woodlands Manager for Repap in New Brunswick, and widely known for his special Maritime wit. In one session of the National Round Table on Forestry, of which Joe and I were members, we had been discussing biodiversity for several days, all in very positive and supportive

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 the fall of 1996. This will become an annual event to commemorate the late J.D. Little, former Senior Vice-president 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. The inaugural lecture by Dr. Rod Carrow, former Dean of Forestry at the University of Toronto, reflected Doug Little's philosophy that with appropriate forest management, the resources of the forest could be sustained for future generations. The lecture series is supported by an endowment from Northwood Pulp and Timber Limited.

language. Joe brought us all up short one day by announcing that he thought biodiversity was a great thing and he wanted to begin managing for it right away. He was meeting with his woodlands staff the next week, and wanted to direct them to begin managing for biodiversity. He posed the question to all the experts on the Round Table "What should I tell my staff to do to manage for biodiversity?" The silence was deafening, and Joe had made the point well, that it's a long way from acceptance of a concept to implementation on the ground.

Very early on, we realized we had an enormous amount of work ahead if we truly wanted to put sustainable forestry into practice. We needed to sharpen our understanding of what it meant in the context of management planning and forest operations. We needed a lot more knowledge about forest ecosystems than we had. We needed more open planning processes that genuinely accommodated the interests of all the major stakeholders. We needed new guidelines, policies and standards. But what we didn't

fully appreciate was that the concept was being introduced and promoted at a time when society was undergoing unprecedented economic and social change, and just how much that change would complicate the quest for sustainability. And in Canada, what is going on in our society is critically important, because that society owns 90% of the productive forest land base.

Equally important is where that society lives. About 80% of Canadians now live in an urban environment and of course, that proportion will continue to increase. On a global scale, our 6 billion residents is expected to become 8 billion in the next 30 years, and over 60% will be urban dwellers (Vidal 1996). The significance of this is that, as a people, we are becoming more and more distanced from the land and the natural environment, and as this happens, we are less and less familiar with it. Yet we are the stewards of that environment.

This is especially evident in Canada. Internationally, Canada is regarded as a forest nation, even though Canadians are not a forest people. This trend to urbanization brings with it important changes in attitude, and important changes in our relationship with the natural environment. Quality of life is becoming more important, and for many, it is more important than standard of living. As well, the precautionary principle is being applied

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increasingly to all facets of life; many people are unwilling to take any degree of risk with their lives or the environment. As we grow richer and more urbanized, more distanced from making a living from the land, we have great difficulty re-defining what it is we want from our forests. Yet that is exactly what we are engaged in as we attempt to define and implement sustainable forestry.

To add to the complexity, we are also in the midst of global restructuring of the economy, with trade barriers disappearing, borderless trade communities being created, and endless mergers and takeovers in the corporate sector. Close to home, we are seeing the most radical change in governments in the past half century, as we attempt to deal with the legacy of living beyond our means for too long. Governments are downsizing dramatically, re-structuring departments, and off-loading programs and responsibilities to the private sector, local governments, non-government organizations (NGO's) and communities.

So our effort to make sustainable forestry a reality in Canada is taking place in the midst of a very dynamic — some would say chaotic — social and economic environment, one which presents many new options and opportunities, but one which is also generating some serious obstacles to the full realization of sustainable forest management. Nevertheless, the forest paradigm has changed, and it is unlikely that, in today's world, we would hear Oscar Wilde repeat his definition of "wilderness" as "a damp place where the birds fly around uncooked."

Canada's Quest for Forest Sustainability

When the concept of sustainable development appeared, Canada's response was positive and relatively prompt. The Prime Minister established the National Round Table on the Environment and the Economy. Provincial and sectoral Round Tables followed soon after, and one of these was the Forest Round Table on Sustainable Development. About the same time, work began through the Canadian Council of Forest Ministers (CCFM) to develop a new National Forest Strategy which incorporated the concept of sustainable forestry. The challenge was to translate a concept into principles and strategies which would provide the basis for new forestry policies and programs across Canada. That effort has been reasonably successful, as we now see the language of sustainable forestry captured in provincial legislation, policies and forest management manuals, in forest industry codes of practice and operating manuals, in secondary school and university curricula, and in many NGO publications. Sustainable development and sustainable forestry have become a standard part of the lexicon of contemporary forest management, even though we still have a long way to go in applying the concepts to forest planning and operations.

With time, we continue to make progress in translating the concept into language that has relevance in forest management. We know the concept has environmental, social and economic components. We also accept that these components must be balanced and that one component of sustainability should not be pursued at the expense of another. To make good progress, sustainable forestry needs to be pursued along several fronts, and ideally the initiatives should be coordinated and moved ahead simultaneously. There are six fronts, in which our actions, or inaction affect the degree to which we achieve sustainability in forestry:

1. Strategic planning and policy
2. Trade and economics
3. Organizational structures and delivery mechanisms, which for the purpose of this talk includes the process of forest management and planning
4. Human Resources
5. Funding mechanisms
6. Knowledge and technology, including new operational practices

Canada has invested a lot of effort in some of these — strategic planning and policy, trade and economics, forest management planning, and new knowledge and technology, and we have made good progress in those areas. But we have almost ignored the need for change in our organizational structures and delivery mechanisms, and more attention is needed on human resources and appropriate funding mechanisms. Unless we pay more attention to these components, our success in achieving sustainable forestry will fall well short of what is possible in Canada.

I'd like to review these components for success, highlighting the options and opportunities I see, as well as the obstacles we have to overcome.

The Elements for Success in Forest Sustainability

1. Strategic Planning and Policy

Canada has made impressive progress in developing new policies, legislation and strategies to achieve forest sustainability. The evidence is there across the country — the National Forest Strategy, the Canadian Biodiversity Strategy, Criteria and Indicators for Sustainable Forest Management, BC's Forest Practices Code, Ontario's Crown Forest Sustainability Act, the Ontario forest industry's Code of Forest Practices, the World Wildlife Fund's Endangered Spaces program, and so on.

These are impressive achievements, and Canadians should take pride in them. While they do not in themselves result in sustainable forestry on the ground, they do provide an essential basis for making the tough decisions on how to allocate increasingly scarce financial and human resources in both the government and private sectors.

I am concerned, however, that the **process** used to develop these strategic plans and policies limits the degree to which we can achieve forest sustainability in the broad sense. In general, these new initiatives have been guided strongly (some would say "captured") by the traditional stakeholders — the forest industry, the provincial and federal governments. Yes, there has been broad public consultation and most of these new initiatives have been endorsed by a broad range of interest groups. The 1992 National Forest Accord, the companion document to the National Forest Strategy, was endorsed by 27 organizations. Having been part of the process and several like it, I can tell you that the central thrust and shape of such a document is determined largely by a few primary stakeholders. Although there has been broad public consultation, the development of such policies and strategies has been driven by a small policy network made up of governments and the forest industry, what could be called a "closed policy network". The question is: Is such a closed network the best vehicle for developing new strategies and policies that capture fully the potential and the spirit of sustainable forest management? I think not.

Let us look for a moment at our forests in a broad sense. Canada is a forest nation. Our forests represent 10% of the world's forests and they cover 45% of our landbase — over 400 million ha. Over half that area — 57% — has potential for commercial timber production, but the more significant statistic is that only 29% of our forest land base is currently managed for timber production. But as we pursue the concept of sustainable forestry — a concept which we all agree is very broad and comprehensive, incorporating a range of ecological, social and economic goals — we do so using historic government or business structures which have narrowly-defined mandates.

Thus the National Forest Strategy was developed by the Canadian Council of Forest Ministers (CCFM), a body with an historic focus on commercial timber production and the 29% of the land base that is managed for commercial timber. Who is looking at the other 71% from the standpoint of achieving the multiple goals of sustainable forest management?

The Canadian Biodiversity Strategy (Environment Canada 1995) is an example of a strategy developed through a broad inter-sectoral working group, including forestry. This too is an impressive contribution to sustainable forestry, but would it not have been more effective to combine the national strategic planning for timber and biodiversity? Planning for the preservation of biodiversity and long term supplies of commercial timber is an exercise that should be tightly linked and include all of the forested land base. Naturally the same argument could be applied to strategic planning for wildlife habitat, outdoor recreation, remote tourism, etc. This example simply illustrates the weakness of using a narrowly-defined, or closed policy network, to develop strategic plans for sustainable forestry. Such an approach inhibits the shift towards true sustainable forestry, because sectors which could contribute substantially to diversified economic activity, community sustainability, and environmental protection are excluded from actively participating in strategic planning. We need a more open policy network in Canada if we are to realize the broad range of economic options that reside in the forest land base.

Jeff Neeley, President of the International Union for the Conservation of Nature (IUCN), provided a framework that would be very useful in developing strategic plans and policies for sustainable forestry in Canada. He pointed out that our forest land base is so enormous that it presents an opportunity for four broad management zones:

- areas that could be intensively managed for timber production,
- areas that could be actively managed for multiple uses, timber and non-timber,
- areas that could be extensively managed (with minimal inputs), and could provide wildlife habitat, recreational use and occasional, limited timber supplies if required, and
- protected areas.

I see this as an attractive and useful framework for Canada, to use in planning and managing for all the elements of sustainable forestry on a regional and national scale. Perhaps the most serious obstacle to such an approach is psychological; admittedly, planning and managing on this scale it is a somewhat daunting undertaking. There could be a serious financial obstacle as well, if only because of the requirement for natural resource information that we don't have.

It is interesting to note however, that New Zealand was able to introduce a similar restructuring 10 years ago; their forest industry is sustained entirely on plantation-grown stands which occupy only 10% of the national forest land base. The other 90% is designated as conservation forest, which provides extensive wildlife habitat, maintains biodiversity and supports recreation.

2. Trade and Economics

Global marketing of Canadian forest products has long been part of our culture. Foreign demand for our products continues to be strong and is growing. From 1991 to 1994, there was a 57% increase in the value of our forest product exports — from \$20.6 billion to \$32.4 billion. And in 1995, the sector provided direct employment for 369,000 workers — the highest level in the past decade. But there are many opportunities for other uses of our forests that are not being developed and marketed enough, activities such as remote tourism, ecotourism, and public recreation — generally activities which can be carried out with the forest as the venue. The economic potential for such activity is reflected in this quote from the Economist (1991): “As people grow richer, they prize — and will pay for — the recreation they can find in woodland, and the pleasure they derive from the knowledge that they are preserving nature.”

Growing criticism of forest practices intensified a little over 10 years ago, with attention focused on logging of old growth forests in Temagami and the Pacific Northwest, and logging on steep slopes on the South Moresby Islands. These campaigns in themselves did little to change the way forestry was practised, but since then, the threat of economic boycotts on Canadian forest products and more widespread concern about environmental integrity has driven the forestry sector to become more pro-active in changing the way it does business.

The certification program for sustainable forest management which has been developed through the Canadian Standards Association is a great step forward and Canada's forest industry should be commended for taking the initiative, instead of waiting for governments to impose more restrictive legislation. Green certification provides a credible mechanism whereby forest companies can be independently evaluated against a set of criteria and standards that constitute sustainable forestry. This is not unlike the process which has been used for some time to evaluate the performance of industrial licensees operating on Crown land under long term agreements.

Yet the prospect of green certification of industrial operations reminds us of an anomaly that has existed for some time. Independent audits of industry performance in the past have been confined to areas that are under license to the industry; they have not been applied to forest land under Crown management. Apparently, this anomaly will continue with the green certification program, so we may well have a situation in which industrial operators in Canada will be certified according to CSA standards, but the provincial forestry agencies who have responsibility for Crown land management in the same area will not.

In fact, there are many across Canada who believe that provincial agencies would have great difficulty meeting the standards for certification. If this is the case, it will indeed pose an interesting dilemma for those involved in marketing Canadian forest products internationally. So here is an obvious oppor-

tunity, and a challenge to provincial governments to work towards certification for the lands they continue to manage in future.

3. Organizational Structures and Delivery Mechanisms

In the early 1980's, I worked in New Brunswick at a time when the province had just introduced a new Forest Act, and assigned the management of all Crown forest land to industrial licensees under Forest Management Agreements (FMA's). It was during that time that I became aware that the way in which government departments were organized and mandated, the contractual obligations of the FMA's, and the location of licence boundaries made it difficult to achieve an ecosystem-based, integrated approach to forest management. Of course, at that time, sustainable development was not yet part of our language, but the awareness of an integrated, ecosystem approach to resource management was there in government policies. When one considers the full implications of sustainable forest management, with its economic, environmental and social elements, it is clear that our current organizational structures, both in government and in business act as an impediment to achieving sustainable forest management.

The Brundtland Commission pointed to the historic error of governments around the world when they responded to the challenge of environmental degradation by establishing new departments of Environment which were separate and distinct from departments with economic development mandates. Jeremy Rifkin, in his new book "The End of Work" (1995), has pointed to this phenomenon in a different context. In an environment of rapidly-emerging new technologies, "the failure to achieve productivity gains faster lay not with the new labor-saving, timesaving information technologies, but rather with outmoded organizational structures that were not able to accommodate the new technologies." And Maurice Strong, noted international environmentalist and former Chairman of Ontario Hydro, makes the point even more emphatically: "The biggest single challenge facing the world community today is to establish effective mechanisms for governance, or management, at the international level, with workable linkages to the other levels of governance, from national to local" (Strong 1984). Historically Canada's forest sector organizations developed with a dominant focus on the extraction, manufacturing and marketing of commercial timber products. They were not designed to manage the forest environment to meet the broad economic, social and environmental goals of sustainable forestry, and generally, they are having difficulty responding effectively to that new expanded mission.

Across Canada, many of the important components of sustainable development are lodged in separate government departments, all of which are competing for diminishing resources. Some departments of natural resources have multiple resource responsibilities, with timber, parks, fish and wildlife under one Minister, but we also see some cases in which those responsibilities are spread among several government departments. Even the so-called "natural resource" departments have generally emerged by re-naming departments which had a historic focus on commercial timber, and indeed it is clear that the dominance of timber within the mandate of many natural resource agencies still persists. Even with the broader mandate of many departments, one component which is generally missing is tourism and recreation.

So here is a clear need and an opportunity for the establishment of new organizational structures with a mandate to practise sustainable forest management — single agencies which have the

authority and responsibility for integrating economic, social and environmental goals on defined forest land bases. The enabling policies and legislation are generally there to support sustainable management, but the organizational structures are not. The existing natural resource agencies are still structured to manage for a sustainable timber supply while accommodating other interests and values. They are not structured to **optimally** manage for economic, social and environmental goals. The big question is whether existing government agencies have the will or the capacity to re-structure themselves enough to undertake a truly comprehensive approach to sustainable management. Personally, I doubt that they can re-structure from within. Those who have a stake in the past usually have great difficulty developing a new vision for the future.

Two possibilities come to mind. One is that a provincial Premier, if he is personally committed to the principle of sustainable development, could re-structure the Cabinet and create a Ministry with the broad responsibility for sustainable management of the forest land base. The other possibility, probably easier to achieve, is to design **new delivery systems** for managing forest land in accordance with the objectives, standards and criteria for sustainable management. The common delivery system which has been used in recent times by provincial governments to achieve forest management is the industrial licence, such as a Tree Farm Licence or a Forest Management Agreement — a long term lease arrangement whereby the industrial tenant enters into a contractual agreement with the province (the landlord) to carry out specified resource planning and management activities in return for the right to harvest commercial timber.

If one steps back from the situation and thinks of it objectively, this is a curious arrangement. Collectively, we agree that our forests are our most valuable natural resource and they need to be managed in a sustainable fashion. We also agree that a portion of the forest should support a range of human activity, some commercial and some non-commercial, and we agree that a portion should be protected from development activity. The current licences confer on the industrial licensee the right to harvest commercial timber and to manufacture and sell the products. This activity is the revenue generator. A condition of that right is that the licensee must protect and conserve many non-timber values — wildlife habitat, riparian zones, water quality, recreational sites, access roads for other forest users, remote tourism landscapes, etc. Yet the legislative responsibility for these values and the opportunity to generate revenue from non-timber activities remains with the province. Generally, the licensee can derive no revenue from managing for non-timber values; in fact, many of these responsibilities are significant cost items to the licensee. So, on the same forest land base, we have a situation in which the responsibility for managing is divided between the government and the licensee, much of the cost of managing for non-timber values is assigned to the licensee, and revenues are shared between government and the licensee. Knowing what we know about the goals and objectives of sustainable forest management, is this an effective or efficient delivery mechanism? I think not! Divided management responsibility results in divided public accountability, inefficiencies in planning, management and operations, and lack of coordination of management goals.

Let me suggest two models for alternative delivery mechanisms which deserve more widespread consideration and application.

1. Integrated Resource Management Licences. Most provinces retain a large amount of forest land base as Crown Management Units. With downsizing of governments across the country and increased privatization, there is an opportunity for provincial agencies to convert some Crown Units to Integrated Resource Management Licences. Such a licence should have as its goal the integrated management of the land base in the licence area.

The licensee would have responsibility for managing **all** resource values and activities, in accordance with criteria and standards defined by the province which ensure forest sustainability. The Criteria and Indicators for Sustainable Forest Management, developed by the CCFM, could be part of these provincial standards, but by themselves, don't adequately address the non-timber values of our forests. The licensee would have the opportunity to generate revenue from all activities and uses, but would be responsible for all costs. Since the licence is Crown land, free public access would have to be assured; however, the licensee could charge for the use of facilities and services. Such a licence should not necessarily have a mill as a requirement. Appropriate compensation to the Crown for such use could be negotiated between the licensee and the government, just as it is for the current industrial licences. The important characteristic of such a licence is that all resource planning and management would be unified under **one** organization, not divided between government and the private sector.

An Integrated Resource Management Unit is not a theoretical model; such an operation has existed in Canada for over 30 years. The site is the Haliburton Forest and Wildlife Reserve in Ontario, a 20,000 ha forest which has been managed as a business for multiple uses and values for three decades. The forest supports a range of activities, all of which are compatible with the owner's objective to manage the forest sustainably for himself and for his children. The activities include: 350 wilderness campsites which are leased on a yearly basis; hunting leases; fishing rights; snowmobiling on 300 km of groomed trails; mountain biking; harvesting of sawlogs and firewood; maple syrup; outdoor education; conferences; worker training; summer music camps, etc. All public uses involve some level of user fee. Although the Haliburton Forest is privately owned, there is no reason why such an approach to integrated resource management could not be applied to some Crown land on a licence basis. I want to emphasize that I am not proposing the privatization of Crown land, nor am I suggesting that such a system be universally applied to Crown land, but in the context of the zonation system proposed by Neeley, integrated resource management licences have real potential in areas suited to multiple uses or extensive management.

2. Community-based Management Boards. A second model — the community-based management board — has arisen in situations where the traditional industrial forest licence seemed inappropriate to meet the diverse needs of economic activity, community development and environmental protection. In Nova Scotia, the communities in the Bras d'Or Lakes watershed have been pressuring governments to develop a long term plan for nearly 25 years, without success. The major obstacle is that 22 government agencies have some responsibility for economic development and environmental protection in the watershed, which covers about 360,000 ha; there is a history of 20 years of failed attempts to coordinate government planning and programs. A community-based task force, which I chaired, devel-

oped an alternative model — a community-based Stewardship Commission, with the legislative authority and responsibility for watershed management and development transferred from several provincial and federal agencies to the Commission. Although the model was supported by most government agencies, one or two of the provincial agencies are resisting the establishment of the Commission, because it would require that they give up some of their authority in the watershed area.

A more successful model is being established in Ontario, where the province is in the process of converting all 25 of its Crown Management Units to Sustainable Forest Licences. In the Bracebridge Crown Management Unit, which has a high degree of public use, as well as historic timber activities, an SFL was considered to be inappropriate for forest management. Building on the Bras d'Or experience, as well as that of the Model Forest program, a new community-based forest Management Agency is being put in place — an agency which will have a Board of Directors, a professional and technical staff and a start-up mandate of managing for timber and outdoor recreation. The intent is to expand the mandate as the Agency gains experience. A key feature of this Agency is that it will be arms-length from government and have the right to generate revenue from activities on Crown land to support its operations, rather than relying on continuing government support. Financial independence is one the Agency's objectives.

A third example is the Model Forest program. Through the McGregor Model Forest, many of you are familiar with this program. While the Model Forests are an excellent step forward in integrating more values into planning, decision-making and improving our understanding of how forest ecosystems operate, they are still largely driven by the focus on timber management, with increased accommodation of other values. In my view, the most significant contribution of the program to date has been to demonstrate the value of a partnership approach to planning and management, a process in which **all** major forest stakeholders participate actively in setting goals and establishing priorities for programs and activities. The advances of the Model Forests in public participation, conflict resolution, the promotion of new ecologically sound silviculture and harvesting systems, and improved understanding of the whole forest ecosystem have been truly impressive, and I think the Canadian Forest Service and the Model Forest partners should take great pride in the program — one that is recognized internationally as a leading edge initiative in the quest for forest sustainability. I think the model of an independent Board of Directors, supported by a competent staff will prevail and I think it will be imitated elsewhere as we look for new ways of achieving sustainable forestry. Certainly, the Bracebridge Forest Management Agency in Ontario was designed largely on the basis of the Model Forests.

Of course, the biggest obstacle to these alternative models for delivering resource management is the provincial bureaucracy, which is often resistant to the notion of transferring authority and responsibility to non-government organizations. The reasons for resistance are fairly straightforward and understandable: diminution of purpose and resources, a reluctance to change, the unwillingness to risk eroding the progress that has been made, and doubts about the trustworthiness and competence of non-government organizations operating on Crown land. But these doubts are not well founded in the present day, and there are plenty of examples of non-government models that are perfectly

capable of managing forest lands in accordance with specified standards and conditions.

4. Human Resources

It has often been said that forest management is more about managing people than about managing forests. Amen to that! The question is whether our professional and technical staff are adequately educated and trained to meet the challenges of sustainable forest management as it is being applied across the country and around the world. Not surprisingly my answer is "No." Over the past 15 years, Canadian Forestry schools have been in a continual process of curriculum revision, in an effort to catch up with the present. The new challenges of forestry have evolved more quickly than the schools have been able to adapt. Those of us with experience in academic administration know what a protracted and complex process curriculum revision is in the university system. The consultation with students, alumni, the large and diverse constituency that has an interest in forestry, the design and approval by faculty, and the academic approval process can take years. And by the time that change is in place, it is time to start again. Of course, the folly of this approach is that the schools are always reacting to **current** situations and crises, and it is extremely difficult for them to move beyond the present into visionary planning. One contributing factor is that curricula must meet the requirements of accreditation boards, such as the Canadian Forestry Accreditation Board, and it becomes nearly impossible for forestry schools to institute the degree of change necessary to produce graduates who are truly prepared for sustainable forestry, and still meet accreditation criteria.

Yet it is the professional forester who will continue to play that central role as the author of forest management plans. Keeping in mind the new challenge of sustainable forestry, what should the sustainable forest manager (not the sustainable forester!) look like? Just as we need some new structures in government and some new systems to deliver sustainable forestry, we need some new structure in our post-secondary education system to produce the appropriate type of natural resource manager.

Two changes are necessary:

1. The field of natural resource management requires so much understanding in both the natural sciences and social sciences, as well as the ability to think horizontally and integrate knowledge from diverse disciplines, that we can no longer reasonably expect a student to acquire the necessary education in just four years after graduating from secondary school. Further, it is increasingly unrealistic to expect a Grade 12 student to make an important career decision in a world which offers so many diverse and changing opportunities. Many professional university programs have converted to second entry programs, i.e. they require the student to have completed a certain amount of basic post-secondary education before applying for the professional program. This has several advantages: it provides the student with the basic liberal arts and science "education" which is so important for more applied courses, as well as personal literacy; it gives the student a chance to demonstrate what he/she can do at the post-secondary level, and the student gains some maturity before making an important decision about future specialized education.

Interestingly, this is already happening informally; a few years ago, only 17% of the entering class at UBC's Faculty of

Forestry came directly from high school (Binkley 1991). Nevertheless, it is time to make natural resource management programs second entry programs, with the requirement that the student have completed a certain number of specified arts and science courses. The University of Toronto has introduced a version of the second entry model, with its Masters in Forest Conservation program, which started this fall. The difference is that this is a graduate program, and entering students must have a Bachelor's degree, with a certain amount of undergraduate preparation in specified subject areas.

2. The second change is a great opportunity, which is presented by the concept of sustainable forestry. Forestry schools continue to educate and graduate students who are specialized in one on the major fields that comprise contemporary forest management — wildlife, outdoor recreation, or forestry. What is missing in the picture is the broad generalist, the graduate who is competent in and understands the many components — economic, social and environmental — that constitute sustainable forestry. In our effort to inject more specialized knowledge into the curricula and produce strong specialists, we are neglecting the need to produce the **strong generalist** — the graduate who understands the significance of all the components of sustainability, the one who can truly guide and author the future sustainable forest management plan. The policy statements, the criteria and standards, the legislation that are evolving from the concept of sustainable forestry provide a valuable blueprint for the design of post-secondary education. It's time someone used them! The combination of a second entry program with a strong generalist program in sustainable forest management would produce graduates who have the competence to move Canada along the path to sustainable forestry, **provided** they have the support and commitment of their employers.

There is another aspect of human resource development that needs attention as well. With the trend towards more public participation in resource management, as well as downsizing of governments, more and more pressure is being put on the volunteer community. Some of the alternative delivery systems mentioned before — Boards, Commissions, Model Forests, etc. — rely heavily on volunteers. In Ontario, every Forest Management Unit must appoint a 10-person Local Citizens Committee to assist in management planning. As well, Ontario has abandoned its entire Private Land Forestry program and replaced it with 38 Stewardship Councils across southern Ontario. These Councils are all volunteer and are expected to guide and promote private land stewardship in their areas. As many of these volunteers struggle to understand new concepts and new knowledge, as well as contribute substantial amounts of time, there is a great risk of volunteer exhaustion and burn-out. The post-secondary forestry schools could help greatly by offering short courses to these volunteers to familiarize them with new policies, legislation, and forest management and operations.

5. Funding Mechanisms

Sustainable forestry may be a great concept in the classroom the boardrooms and the legislatures, but its impossible to avoid the bottom line. Who is going to pay for it? The answer to that is "a lot of folks, but they don't all live in our backyards". If you travel internationally, it doesn't take long to discover that people in other developed countries — western Europe, the Asian rim, parts of South America, the United States — see Canada

as a forested country with unique opportunities for tourism and recreation. Travel through northern BC, the Yukon, the Northwest Territories, coastal BC, northern Ontario, and the Maritimes and make a mental note of who is there — people from all over the world. There is enormous potential for remote tourism, eco-tourism, outdoor adventure and recreation in our forested landscapes, but Canada has been slow to recognize the potential and even slower to develop and market those activities internationally. Again the institutional separation of government agencies with responsibility for these types of activities from those with resource management mandates inhibits development of these opportunities.

Both in Canada and the United States, there is growing demand for these activities, especially from urban dwellers. The US Forest Service estimates that their National Forests have the potential to generate three times the revenue they currently bring in (\$3.4 bn vs. \$1.1 bn); they now derive only 3% of revenue from recreation, but they estimate that 40% of their revenue could come from this activity (The Economist 1991). In Canada, we spent \$5.6 bn on wildlife-related activities in 1991, a 33% increase over the previous decade (Environment Canada 1995). On the Haliburton Forest described earlier, only 20% of the revenue comes from timber harvesting; 80% comes from non-timber activities. The campsite leasing program alone generates a third of a million dollars annually. Another example is the Grizedale Forest in northern England, managed by the British Forestry Commission. This is a working forest which also houses a centre for the performing arts and creative arts — activities which attract over 20,000 visitors a year and contribute substantially to local economic activity and community stability.

There are many additional costs associated with the implementation of sustainable forestry, but there are also many opportunities to generate new revenue from the diverse activities that can be part of sustainable forestry. Perhaps the bigger challenge is to design mechanisms that will return enough of this revenue to the forest to ensure its long term health and productivity, especially since almost all of our forest is publicly owned. Historically, provincial governments have used revenues from these lands to fund a range of social programs, to the detriment of the forest. But the recent creation of Forest Trust funds and similar dedicated funds provides a good model to protect against that possibility. As well, the establishment of independent Forest Management Agencies should allow these bodies to generate and retain revenue from various uses, and to control their costs. Again the Model Forests have demonstrated the potential for financial viability with independently managed forests.

6. Knowledge and Technology

Do we have enough knowledge and understanding to practise sustainable forestry? Many critics of forestry would say "No", because we can never know enough to be able to predict every consequence of human intervention in forest environments. They are right about conventional forestry, and certainly they would be right about sustainable forestry. But it is not human nature to do nothing until we fully understand a situation. That approach would truly stagnate us as a species. It is our nature to move ahead, to act, to explore opportunities and address challenges, to try to improve our lot in life. We have made many mistakes in the past and we continue to make mistakes, but on balance, we are moving ahead.

Periodically we should remind ourselves that we gain very little by judging yesterday's performance by today's standards. We made mistakes in the past and we are making mistakes today — some we know about and some we will find out about in future. Generally we do the best we can, given the limitations of our understanding and the limitations imposed by the institutions we have created. One of the things the concept of sustainable forestry has illustrated is that our understanding of the whole system is far from adequate. We know a lot about the management of timber as a resource, and we have made advances in forest management and forest practices, such as new silviculture and harvesting systems, improved information management, and decision-making. But when we move to areas such as biodiversity, wildlife population dynamics and habitat, public recreation, and ecosystem function, we have enormous gaps in knowledge. Through initiatives such as the Model Forest program, and the CCFM Criteria and Indicators, we have enriched our understanding of the forest environment and how it works, but there are many opportunities to strengthen our understanding of and capability in socio-economic sustainability; for example, the challenge of improving economic stability for rural, resource-dependent communities in Canada, the technology of more, small-scale value-added products, and the tourism and outdoor recreation sector.

Summary

In summary, what I have attempted to do is move our thinking about natural resource management beyond the paradigm that has characterized Canadian forestry for the last half century — one that for very understandable reasons viewed the forest as a raw fibre resource that could be utilized to stimulate economic development in rural areas, create employment and wealth, and position Canada as a major world trader in forest products. But in recent times, we have become aware that sustainability is the imperative that must guide our activities in future. And as that translates into more protected forests and reduced wood supplies in some areas, the challenge is to find new ways to create wealth and employment in rural areas without compromising the health and productivity of the forest. This is not a plea to **replace** our traditional emphasis on timber management; it is a plea to **diversify** our approaches to forest management, so that we can supplement income and revenue from timber management, so that we can create new and expanded employment opportunities for people in rural areas, and so we can contribute to the economic and social security of the 350 resource-dependent communities across Canada.

Doug Little had a positive attitude when he said "If we use our forests well, we can provide wealth now and in the future. It's exciting for foresters to renew these forests in the way society requires." Of course renewal in the way society requires is changing. But the concept of sustainable forestry provides a new framework for renewal and management — one that invites diverse approaches to meet the goals of economic, social and environmental sustainability. The concept offers a range of opportunities, many of which Canada is largely ignoring. There are also several obstacles of a rather fundamental nature, especially in the area of organizational structures and delivery mechanisms for natural resource management. But none of them is insurmountable and in fact, I believe they pose a very exciting challenge to all of us.

I don't often yearn to be young again, but I have to say that the exciting opportunities that lie ahead as Canada moves

progressively towards sustainable forestry make me wish I had the knowledge, the skills and the energy that young resource managers have today. Certainly, the diversity of opportunities and the intellectual challenge of forestry today are much greater than when I graduated 35 years ago; there really is no comparison. I hope that all of you involved in managing Canada's forests will emulate Doug Little's positive and constructive attitude and contribute to Canada's quest for forest sustainability.

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