

## **A Call for a Healthy Forest on Crown Land**

### **A brief submitted to the Independent Review of Forest Practices**

**By the**

**Healthy Forest Coalition**

#### **Executive Summary**

Intense forestry has subjected much of Nova Scotia to repeated harvesting such that forests today are severely depleted. The forested workable landbase measures about 3/5 of Nova Scotia and of this about 25% is Crown Land and the rest is either small private or large industrial ownership. Crown Land has served as a reserve for industrial forestry and thus fundamentally been given to large forestry companies for their benefit. Here we present a call for managing Crown Land for the benefit of all Nova Scotians.

The Healthy Forest Coalition is a group of Nova Scotians who are concerned by forestry practices in this province, particularly on Crown lands.

‘A healthy forest supports a healthy economy.’ Nova Scotians could nurture a new forest. A forest representative of the species dominant here for centuries and best suited to our soils and climate. A forest that, by thriving on restored bio-diversity could revive our forest economy. Only government can start this process. We urge the government to:

1. Inspire Nova Scotians with a new vision of the forest
2. End the conflict of interest at DNR.
3. Recognize that strong economic and scientific data support major change in policy on Crown land.
4. End policies that exploit resources on Crown land.
5. Introduce a strategy that will accord all Nova Scotians the economic benefits of carbon off-sets on Crown land.
6. Introduce policies that reward stewardship and conservation on Crown Land.
7. Recognize that tourism based on our beautiful forested land and seascape brings employment to Nova Scotia’s rural areas.

Our brief begins with a summary of seven recommendations. That is followed by an introduction (Part 1) that outlines our view of the crisis that affects our forests and their management. We then proceed (Part 2) to analyze the current situation in light of the seven general recommendations. As we do so, we present more detailed proposals and recommendations for carrying out these larger goals. Although our brief focuses on Crown land management, we recognize that the forest takes no account of the artificial boundaries created by us, and that, therefore, policies that manage Crown lands may affect private lands.

## SUMMARY OF RECOMMENDATIONS

### **Recommendation 1. Inspire Nova Scotians with a new vision of the forest and**

### **Recommendation 2. End the conflict of interest at DNR**

Our discussion of these two recommendations envisages a stewardship department (The Forests Department) responsible for establishing long-term policies for forest management and, in light of these policies, decide where harvesting would be allowed and how it should be carried out. A separate commission would be responsible for presiding over the actual allocation of cutting limits to competing enterprises.

We recommend that a new *Forests Act*:

- Establish a Forests Department
- Identify the primary responsibility of the Department as one of stewardship, including advising the government on the measures needed to restore Nova Scotia's forest to a high level of health, and to maintain the forest at that level, having regard to:
  - Soils: minimizing erosion, ensuring retention of essential minerals fungi and other soil organisms.
  - Water: maintaining water quality at a level required to support aquatic species.
  - Bio-diversity: restoring, protecting and maintaining insect, animal and bird life, and restoring, protecting and maintaining indigenous plants.
  - The structure and composition of tree cover, including:
    - Restoring the Acadian forest.
    - Determining the distribution of age classes required to assure the long term health of the forest.
    - Anticipating and accommodating the effects of climate change.
- In all its undertakings to respect the historic, cultural and spiritual requirements of the Mi'kmaq.
- Require the Department to:
  - Develop policy on establishing, maintaining and enforcing a ban on clearcutting on Crown land.
  - Develop policy permitting selection harvesting while maintaining canopy closure on Crown Land.
  - Consult with woodlot owner groups and owners of industrial forest lands in order to determine the extent of annual cuts on Crown and private lands.
  - Determine what portion of the annual cut should be taken from Crown lands and where cutting should take place.
  - Advise the Timber Allocation Commission of those allocations.
- The Department should be empowered to:
  - Regulate selection harvesting practices in order to maintain canopy closure on Crown lands.
  - Regulate harvesting on private lands where it may affect water courses, soil quality, habitat for protected species and connectivity.
  - Monitor harvesting activity.
  - Halt harvesting where regulations have been violated or the Department has reason to believe that continued activity will cause harm to the physical environment or to protected animals and birds.

- The Department should:
  - Carry out scientific studies, including regular forest inventories, that support its primary mandate.
  - Support independent research on issues related to forest health.
  - Provide for peer review of in-house and independent research funded by the Department.
  - Ensure the timely publication of such studies.
  - Ensure that such studies are considered in advising the government on measures needed to maintain forest health.
- The Department should:
  - Ensure that there is fully informed, adequate and timely consultation with the public on all issues relating to the determination of long-term forest planning, protection of endangered and threatened species, the allocation of areas for harvesting and the application of harvesting techniques.
  - Develop and maintain strong consultative relationships with the public at large and with its immediate policy community, including woodlot owner groups, owners of woodlands, forest industry groups, producers of non-timber forest products, naturalist organizations, environmental groups, recreation groups/ authorities and tourist enterprises.

In order to separate the allocation of harvesting licenses to forest enterprises from decisions that have regard to the Forests Department's responsibility for determining the harvest on Crown lands, a separate timber allocation body should be established.

The *Timber Allocation Act* should:

- Establish the Timber Allocation Commission.
- Set out the terms of appointment to the Commission, including
  - Ensuring that Commissioners are conversant with the scientific, business and forestry aspects of forest management, but do not have interests that conflict with their responsibilities on the Commission.
  - Procedures for making appointments to the Commission and for dismissing Commissioners.
  - The duration of terms.
- Require the Commission to:
  - Establish procedures for ensuring that the Crown receives fair market value for timber stumpage.
  - Ensure that timber from Crown land allocations cannot be harvested in such a way as to suppress, or otherwise constrain, the operations of a fair market in cutting, transporting or selling of timber from private lands.

### **Recommendation 3: Recognize that there are strong economic and scientific data that support a major change in policy on Crown Land.**

We recommend:

- The Department be required to establish designated research funds for enquiries into forest management and policy issues; to issue public tenders for designated projects and projects proposed by researchers and to publicize the awarding of project grants.
- The Biodiversity Science Advisory Committee, or another advisory board, selected in consultation with professional bodies in forestry and science and composed of external and in-house scientists, should

review all applications for projects, including in-house applications and also review mandatory progress reports.

- Forest management guides should be reviewed by the advisory board. High priority should be given to reviewing existing guides and revising them to reflect current science in biology and forest management.
- Research reports should be reviewed by the advisory board and submitted to peer-reviewed journals.
- All research reports should be available to the public on the departmental website.
- Similarly forest data should be available to the public, on the department website, in accessible forms.
- To facilitate the incorporation of up-to-date forest science into management plans, the Department should ensure that all research reports are available for circulation across the department and should be formally presented to departmental personnel and the public on a regular basis.
- Economic data and departmental economic research should be treated in similar fashion.

#### **Recommendation 4: End policies that exploit resources on Crown Land.**

- A reduction in forest harvesting throughout NS is essential in the near-term for restoring healthy and diverse forests.
- To restore public confidence, revise the definition for ‘clearcutting’ to be scientifically valid. Ban clearcutting on Crown lands and in watersheds that are being severely impacted by acid rain.
- Encourage partial harvest techniques through economic incentives that provide protection (*e.g.*, shading) to forest soils to retain nutrients. Partial harvests (maintaining closed canopy) must become the norm in the Acadian forest to ensure more high quality, late successional (shade tolerant) trees are grown that will support a diversified forest economy including a stronger saw log economy.
- Landscape issues should have priority in allocation decisions.
- Expand the Community Forest Model across a much greater portion of the Crown lands. This is one of the very best ways to put our public lands back into the hands of a knowledgeable public in a way that benefits communities and local businesses rather than a few mills.

#### **Recommendation 5: Introduce a strategy that will accord all Nova Scotians the economic benefits of carbon off-sets on Crown Land.**

- We must recognize that forest biomass electricity is an inefficient, non-green energy source and we must eliminate primary forest biomass from the list of renewable electricity sources. It follows that we must decommission existing biomass electricity plants.
- We should use forest biomass only as localized energy sources for ‘space heating’ rather than for electricity. (*Biomass provides 3-4 times more energy as heat than it does as electricity.*) and we should support community co-operative energy groups that obtain/store surplus electricity from solar, wind, tidal, or hydro sources.
- Legislation should ensure that ‘full-tree’ harvesting does not take place under any circumstances. Only removal of stem wood is acceptable. Regulations should prohibit buyers from purchasing biomass containing branches, foliage and tops.
- The export of wood pellets should be banned.
- A system of carbon off-sets should be introduced, enabling the Crown and woodlot owners to benefit from retaining standing timber.

## **Recommendation 6. Introduce policies that reward stewardship and conservation.**

- Prohibit clearcutting on Crown land
- Enhance education programs, perhaps including short-term bursaries, to assist forest workers to migrate to selection management.
- Use tax incentives to encourage contractors to downscale their equipment
- Require the mills to establish an equipment loan fund
- Enhance the sustainable forestry program.
- Establish short term programs in pre-commercial thinning (PCT).
- Make good stewardship pay.
- Promote Value-Added Forest Products
- Promote non-timber forest products.

## **Recommendation 7: Recognize that tourism based on our beautiful forested land and seascape brings employment to Nova Scotia's rural areas.**

We re-iterate our recommendation that clearcutting be banned on Crown land.

We also recommend that:

- The Forests Department encourage private woodland owners to adopt selection management techniques, particularly in areas highly dependent on tourism.
- The Forests Department, the Department of Transportation, and Tourism Nova Scotia work closely to minimize the impacts of industrial harvesting close to parks and to areas where wilderness tourism is viable.

# Part 1: Our view of the crisis in Nova Scotia forest management

## Introduction

Nova Scotia's working forests are [severely depleted](#). Intense forestry has subjected many areas across the province to repeated harvesting. Today clearcutting predominates. A single person operating a modern harvester can cut and remove all the trees in an area extremely quickly and efficiently.

While we recognize that working forests are not, and cannot be, pristine wilderness or public parks, we are convinced that action must be taken to curtail the destruction wrought by industrial forestry. Today we are living the latest chapter in a tale of despoliation, a few mills are scrambling to harvest the last remaining stands of quality timber while the rest of our forest enterprises are reduced to cutting young and early successional stands for pulp and [biomass](#). Through clearcutting – where even the shrubs may be chipped – we are witnessing an appalling rate of forest liquidation. In the last 25 years 1.2 million hectares have been clearcut. According to the Department, this is 40% of the land-base suitable for forestry and 60% of the operable land base without restrictions in Nova Scotia. At this rate of harvesting future forest stands will be no older than about 50 years, biodiversity will have disappeared and the Acadian forest with its variety of late succession trees will be replaced by early succession, low quality trees of small diameter mostly suitable for chipping; a sad legacy to leave our children and grandchildren.

The Healthy Forest Coalition is a group of Nova Scotians who are concerned by forestry practices in this province, particularly on Crown lands. We come from all parts of the province: from rural areas where we see first-hand the impact of clearcutting; from small towns and villages diminished by the decline in enterprises that depended on the nearby forest for timber and non-timber products, and from urban centres where we worry about clearcutting's impact on biodiversity, climate, global warming and on tourism, an industry four times the size of forestry.

Our considerable numbers include trained foresters and forest technicians, woods workers, scientists with forest ecological expertise and ordinary citizens. Some of us are Mi'kmaq who are deeply wounded by the desecration of a natural world that sustained us and we nurtured for aeons. We know what we are talking about.

We view current policies and practices with immense concern because it appears to us that those policies and practices not only have severe adverse effects on forests and forest biodiversity, but, as a result spell long-term economic collapse for employment, rural communities and forest enterprises.

Crown lands are our lands. They belong to the people of Nova Scotia. As citizens, we have a stake in these lands, and a right to object to policies and management regimes that have created this sorry legacy. We also have the right to propose better policies and management regimes. That is the purpose of this brief.

We believe that 'a healthy forest supports a healthy economy.' We also believe that we could nurture a new forest. A forest representative of the species dominant here for centuries and best suited to our soils and climate. A forest that, by thriving on [restored bio-diversity](#), could revive our forest economy. A forest capable of meeting the challenges of climate change. Only government can start this process. We urge the government to:

1. Inspire Nova Scotians with a new vision of the forest. Set goals. Create a regime of forest management that will enhance biodiversity and realize the full potential of our timber and non-timber resources.
2. End the conflict of interest at DNR. Create a new department with pre-eminent responsibility for stewardship of our resources and assign to a separate commission the allocation and marketing of those resources deemed to be available.

3. Recognize that there are strong economic and scientific data that support a major change in policy. Ensure that biological sciences influence stewardship policy and that landscape level factors – not narrow stand-level considerations - drive harvest decisions.
4. End policies that exploit resources. Impose a moratorium on [clearcutting](#) and two-stage clearcutting on Crown lands. Stop treating Crown lands as reserves for private mills. End intensive forest management and ban the export of unprocessed wood and wood chips.
5. Introduce a strategy that will accord woodlot owners the economic benefits of [carbon off-sets](#).
6. Introduce policies that reward stewardship and conservation. Encourage [ecologically sensitive harvesting](#) of forest resources with programmes that reward silviculture (in its broadest sense) and minimize the use of the larger and heavier harvesters. Foster [non-timber forest products](#). Such changes can reverse the decline of employment in our woods.
7. Recognize that [tourism](#) based on our beautiful forested land and seascape brings employment to Nova Scotia's rural areas.

### *How we got here*

For over fifty years the province adapted to the needs of the pulp and paper industry. Government policy accommodated the industry - providing land, financial resources and access to raw materials, while approving supportive silviculture programs and countenancing their oligopolistic business methods. The result was to convert much of the province's natural Acadian forest into a boreal forest suitable for pulpwood. Forestry policy makers and specialists became expert in softwood management. Harvesting methods gradually reduced the presence of trees and age classes that were surplus to pulp and paper requirements. Silviculture emphasized softwood plantations and regeneration. Timber licenses reflected the same preoccupation. Our foresters were hired from schools that specialized in boreal forest management. The forest management guides they prepared to assist woodlot owners and contractors emphasized softwood management. Even local sawmills that had once processed timber ranging from spruce to oak, became highly specialized, each processing logs of only a few species directed to them through a streaming process orchestrated by the pulp and paper mills.

When the pulp and paper industry began its decline in the 1990s, industry watchers predicted that Stora-Enso and Abitibi-Bowater would abandon the two pulp and paper mills they operated in the province. Yet no steps were taken to anticipate the crisis that would follow. When the inevitable happened, first the Dexter government and then the current government found that they were stuck with a young, largely boreal, forest that had lost its market. Furthermore, timber harvesting during the later years of the last century had greatly reduced the older age classes in the working forest. Between 1958 and 1995 the proportion of timber in the 81-100 year age class had shrunk from 16% to 0.9%.

Also predictable was the response of our governments to the decline of the industry. Attempts to retain the mills, then to find new buyers and, that failing, to establish alternative industries, all consumed a great deal of money and effort, with only modest success. At Port Hawkesbury an operator took over a much-reduced operation. An associated co-gen facility consumed far more biomass than had been predicted, or that could be derived from mill waste. At Liverpool an innovation centre was established in the former mill. It focused on developing bio-fuels. One way or another, it seemed that our working forest was destined to be dominated by short rotations of spruce and fir that would be harvested for biomass. Government did at least manage to keep the Bowater lands out of the hands of speculators. There were suggestions that a significant portion of these lands be managed as community forests, but only one community forest was approved, and it was assigned only 15,000 ha., far less territory than was considered viable. Most of the rest was allocated to a consortium of mills, Westfor, whose operations have generated much of the public anger that precipitated the appointment of this review.

As if this were not crisis enough, Nova Scotia is entering a period of global warming with a forest composed of spruce and fir, two species poorly suited to the looming crisis of global warming.

In 2008 the provincial government launched a major public consultation on a natural resource strategy. Interest was widespread, with consultation sessions attracting members of the public from all walks of life, a great many being connected to the industry. Unlike government and industry leaders, Nova Scotians proved to be very aware of the difficulties facing our forest enterprises and willing to endorse significant change. They generally agreed with the 2010 report on the consultation, *A Natural Balance*, when it asserted that ‘the status quo is not an option. Unless there is change Nova Scotia’s natural resources will continue to be destroyed.’ A compelling case for change was sketched out in Bob Bancroft and Donna Crossland’s majority report of an expert panel on forest issues. The minority report, by Jonathan Porter, an official of Abitibi-Bowater, made the case for maintaining the status quo. The industry lobby mounted a fierce, and sometimes personal, attack on the Bancroft-Crossland report and ultimately succeeded in persuading Premier Darrell Dexter to dismiss John MacDonnell from his post as Minister of Natural Resources. Although the Dexter government, in its 2011 response to the consultation report did endorse some aspects of the natural resource strategy recommended in *A Natural Balance*, MacDonnell’s dismissal made it clear that government policy essentially would not change. This was confirmed by the appointment of Mr. Porter as executive director of the Renewable Resources Branch of the Department of Natural Resources (DNR) and emphasized in August 2016, when it was announced, in a five-year review, that the most significant of the 2011 policies were to be abandoned..

Implementation of the proposals for reform recommended in *A Natural Balance* would neither have prevented the closure of the Stora-Enso and Abitibi-Bowater mills, nor prepared Nova Scotia for the onset of global warming, but it would have given us a 5-year start on meeting both of those challenges. As it is, we are still debating the merits of those proposals and may continue to do so for some time to come. Meanwhile, the forest economy is floundering, the best stands on the Bowater lands have been harvested and clearcutting has wrought havoc elsewhere, thereby contributing further to the decline of biodiversity and to the difficulties global warming will impose on us.

## Part 2: Justifying change

### Recommendation 1: Inspire Nova Scotians with a new vision of the forest

#### *A narrow, exploitive view of the forest*

A century ago the great American conservationist, Aldo Leopold, recognized that there are two approaches to forest management. The first regards the land as soil, and its function as commodity production. Trees are grown like cabbages, with cellulose as the basic forest product. The second regards land as biota with a much broader function and manages trees in a natural landscape.<sup>1</sup>

The *Forests Act* (RSNS 189, c. 179) expresses the first view. It states bluntly that the principal aim of forest management in this province is to exploit our woodlands. According to Section 2, the intent and purpose of the Act is ‘directed towards ... developing a healthier, more productive forest capable of yielding increased volumes of high quality products.’ Provision is made for ‘maintaining or enhancing wildlife and wildlife habitats, water quality, recreational opportunities and associated resources of the forest’ (S. 2(e)), but the thrust of the legislation is to enhance the forest’s capacity to support the harvesting and manufacturing of timber. It is hardly surprising, then, that the Department of Natural Resources, which administers the Act, gives priority to industrial forestry, whether that be plantation forestry, even-aged management, monoculture, harvesting efficiency or even the use of herbicides to control unwanted trees and other plants.

Legislation puts into policy form how a community, at a given point in time, values the things or activities that are being regulated. The *Forest Act*, expresses the values that Nova Scotians attached to the working forest when the Act was proclaimed in 1989. We valued the forest chiefly as a source of material for the pulp and paper industry. The Act reflected historic political sensitivity to the economic aspects of forest management and the close ties between mill interests and provincial political parties. Its purpose was to enforce the orderly exploitation of the large portion of the forest that was reserved for industry – the working forest.

There have been many changes since 1989. Neither the remnants of the pulp and paper industry, nor the lumber industry provide the levels of employment and prosperity that they did some 30 years ago. As an economic asset our forests are not valued by the public as they once were. Instead we have come to attach other values to it. Today the forest is valued by many as an environmental asset, one that preserves biodiversity, ensures water quality and could moderate global warming. Where half a century ago Nova Scotians derived value from the forest by felling trees, today we are about to launch programs whereby woodlot owners can be paid to leave their trees standing. The need to ensure connectivity over habitats is recognized and there is concern over declining populations of birds and other animals. For over a century the forest has been valued for recreation purposes; but today, more than ever. Conservation movements have secured protection for over 12% of our land mass, much of it forest land, and there is a high regard for preserving native species and forests, such as the Acadian forest.

In short, the exploitive values expressed in the *Forests Act* now compete with other, very different, values which should be expressed in a revised Act.

#### *Legislating a broader vision of the forest*

The traditional exploitive view of the forest is no longer acceptable. Today the Nova Scotia public is much more attuned to environmental aspects of forest management and to alternative views of the forest than it ever was in the past. These alternative views include:

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<sup>1</sup> A Sand County Almanac, Aldo Leopold, 1949.

- The Mi'kmaq vision
- Non-industrial utilitarian visions
- The conservation/restoration vision
- The global warming vision

The Mi'kmaq view of the forest was ignored in the periods of settlement and industrialization but in recent years has come to be seen both as symbolic of our recognition of the Mi'kmaq's right to a land that they never ceded by treaty, and as a view of the most appropriate and desirable relationship between humans and the natural world. Just prior to the October 19 Forest Funeral, Melissa Labrador wrote to the Premier expressing her understanding of how her people relate to the forest.

We are a people connected to the land as much as the land is connected to us. Our cultural future depends on the state of the forest. We live in a time of reconciliation. We live in a time where our people are looking to re-connect with their cultural identity that was stolen from them. The forest is a big part of that identity. Our medicines within these forests are a big part of our identity. .... Removal of the forest removes our identity. Removal of the forest removes our abilities to revive almost lost arts. Removal of the forest removes our raw materials required to pass these traditions and arts down to our next generations..... Our lands in South West Nova Scotia, surrounding Kejimkujik are rich in cultural and traditional history. We have a responsibility as a people of Nova Scotia to respect our Forests and keep her and all her creatures safe. For the future of our Mi'kmaq people and all of our generations to come.

Non-industrial uses of the forest share many aspects of the Mi'kmaq vision. The forest is a source of many foods, from maple syrup to mushrooms; medicinal plants; special woods; a place to pray. All of these require biodiversity and most require the sheltering canopy of mature trees.

The conservation/restoration vision was articulated in *A Natural Balance*, particularly in the Bancroft/Crossland report:

- We can restore forest biodiversity by increasing the presence of mature forests across the landscape; we can increase abundances of late-successional tree species; and we can ensure adequate amounts of standing and fallen deadwood habitat. Maintaining biodiversity is the best plan to deal with the impacts of climate change, and the best assurance for continued ecosystem services such as clean water, wildlife habitat, soil maintenance, and flood reduction.
- We can grow high-value trees (valuable species and large sizes) to support an expanded value-added forest products industry, with a particular emphasis on high quality hardwood. An expanded value-added industry will create many more jobs for every unit of wood harvested.
- We can achieve higher timber yields from many of our forest areas through an increase in uneven-aged management.
  - We can create new, rural-based, green forestry jobs through a shift in silviculture (the science of managing forest vegetation to meet human needs) and harvesting practices toward uneven-aged forest management.
- We can better ensure an aesthetically pleasing landscape that is more inviting to visitors to our countryside.
- We can ensure that private woodland owners are supported in carrying out responsible land stewardship.
- We can ensure that our Crown lands demonstrate exemplary management.<sup>2</sup>

The conservation/restoration vision is compatible with that of the Mi'kmaq and of those who use the forest in foraging for food, extracting useful plants and enjoying its many visual and recreational benefits. It shares a great

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<sup>2</sup> Bancroft and Crossland, 'Panel of Experts Report to the Natural Resources Strategy, pp 1-11. <https://novascotia.ca/natr/strategy/pdf/phase2-reports/Forests-Health.pdf>

deal with traditional methods of woodlot management; paradoxically, the same type of management that DNR celebrates annually in the Woodland Owner of the Year awards.

It is not yet clear how compatible this vision is with our emerging understanding of how the forest will evolve as the globe warms. We know that some familiar species in the Acadian forest, oak and white pine for example, should do well in the new climate, while others, such as spruce and fir, will not. Still others will probably migrate from the Carolinian forest. While there is uncertainty, we believe that the conservation/restoration vision is, philosophically as well as practically, conservative enough to help us make a successful transition to the new circumstances.

### ***A new Forests Act***

The Healthy Forest Coalition believes that the time has come to incorporate these visions in new legislation governing forest management, along with those aspects of industrial forestry that are appropriate to the modern forest. This new Act should be holistic, giving appropriate weight to these differing visions, balancing responsibility for biodiversity, wildlife, soils, carbon sequestration, non-timber forest products, recreational/tourist uses and the conservation and utilization of the forest itself. Above all, it should emphasize stewardship, rather than exploitation.

We recommend that the new Forests Act:

- Establish a Forests Department
- Identify the primary responsibility of the Department as one of stewardship, including advising the government on the measures needed to restore Nova Scotia's forest to a high level of health, and to maintain the forest at that level, having regard to:
  - Soils: minimizing erosion, ensuring retention of essential minerals and fungi and other soil organisms.
  - Water: maintaining water quality at a level required to support aquatic species.
  - Bio-diversity: restoring, protecting and maintaining insect, animal and bird life, and restoring, protecting and maintaining indigenous plants.
  - The structure and composition of tree cover, including:
    - Restoring the Acadian forest.
    - Determining the distribution of age classes required to assure the long term health of the forest.
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- In all its undertakings to respect the historic, cultural and spiritual requirements of the Mi'kmaq.
- Require the Department to:
  - Develop policy permitting selection harvesting while maintaining canopy closure on Crown Land.
  - Consult with woodlot owner groups and owners of industrial forest lands in order to determine the extent of annual cuts on Crown and private lands.
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  - Advise the Timber Allocation Commission of those allocations.
- • The Department should be empowered to:

- Regulate harvesting practices on Crown lands.
- Regulate harvesting on private lands where it may affect water courses, soil quality, habitat for protected species and connectivity.
  - Monitor harvesting activity.
  - Halt harvesting where regulations have been violated or the Department has reason to believe that continued activity will cause harm to the physical environment or to protected animals and birds.
- The Department should:
  - Carry out scientific studies, including regular forest inventories, that support its primary mandate.
  - Support independent research on issues related to forest health.
  - Provide for peer review of in-house and independent research funded by the Department.
  - Ensure the timely publication of such studies.
  - Ensure that such studies are considered in advising the government on measures needed to maintain forest health.
- The Department should:
  - Ensure that there is fully informed, adequate and timely consultation with the public on all issues relating to the determination of long-term forest planning, protection of endangered and threatened species, the allocation of areas for harvesting and the application of harvesting techniques.
  - Develop and maintain strong consultative relationships with the public at large and with its immediate policy community, including woodlot owner groups, owners of woodlands, forest industry groups, producers of non-timber forest products, naturalist organizations, environmental groups, recreation groups and authorities and tourist enterprises.

In order to separate the allocation of harvesting licenses to forest enterprises from decisions that have regard to the Forests Department's responsibility for determining the AAC on Crown lands, a separate timber allocation body should be established.

The *Timber Allocation Act* should:

- Establish the Timber Allocation Commission.
- Set out the terms of appointment to the Commission, including
  - Ensuring that Commissioners are conversant with the scientific, business and forestry aspects of forest management, but do not have interests that conflict with their responsibilities on the Commission.
  - Procedures for making appointments to the Commission and for dismissing Commissioners.
  - The duration of terms.
- Require the Commission to:
  - Establish procedures for ensuring that the Crown receives fair market value for timber stumpage.
  - Ensure that timber from Crown land allocations cannot be harvested in such a way as to suppress, or otherwise constrain, the operations of a fair market in cutting, transporting or selling of timber from private lands.

## **Recommendation 2: End the conflict of interest at DNR.**

Legislation not only reflects values, it creates frameworks for policies and these, in turn, set the parameters for programs. To implement these policies, legislation generally identifies official roles and defines the powers and responsibilities associated with them. In the eyes of public servants these definitions are crucially important because they establish what they are expected to do, what they must not do; where they have discretion, and where they don't. Equally, for a department as a whole, the legislative mandate establishes the organization framework it will use.

### ***Exploitation versus stewardship***

We have described the statutory mandate of DNR as 'exploitive'.<sup>3</sup> During the pulp and paper era the exploitive role of the department became pre-eminent. In recent years, as the Department has acquired additional mandates, and as public values have changed, that role has declined somewhat, and the policies enunciated by the department have become increasingly ambiguous. On the one hand they appear to perpetuate the pre-occupation with providing a sustainable flow of fibre that characterized the pulp and paper era, on the other the department's policy statements, its guidance for woodlot owners and a number of its programs reflect the new values that we have described. This has led some environmentalists to suggest that its mandate imposes a conflict of interest on the Department,

From a public administration perspective the exploitive thrust of the *Forests Act* dictates an organizational structure that gives pre-eminence to resource allocation, rather than to stewardship or to reconciling forest resource allocation with other, increasingly valued, roles. This, of course, is yet another reason for recommending that the Act be revised.

### ***What organizational changes could a revised Act introduce?***

Although we have referred to the emergent values that have affected DNR's mandate in recent years, we have not been privy to how the Department has changed organizationally and culturally. Nevertheless, from time to time we hear of clashes between foresters and biologists within the department. We know that similar clashes have occurred elsewhere and that they have resulted in the way other agencies and professions operate. Furthermore, we find that currently there is considerable ambiguity between the aspirational language of key DNR documents and the application of forest management policies.<sup>4</sup> We attribute that to the uncertain outcome of clashes between professional groups. Perhaps, over time, their differences might be resolved through incremental changes in the roles and relationships of units in the organization. Unfortunately, the deterioration of our working forest is proceeding apace, and it is doubtful whether we can afford to allow such internal organizational difficulties to 'work themselves out'. It would be better to undertake a major overhaul of the department alongside a revision of its core legislation.

In this respect, the appointment of the Independent Review may be opportune. It represents a chance for the Government of Nova Scotia to bring the mandate and organization of its forest management agencies in line with emergent public thinking and new professional capabilities.

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<sup>3</sup> Though we have also noted that the *Forests Act* also charges the department with maintaining healthy populations of wildlife, ensuring water quality and sustaining other aspects of forest ecology.

<sup>4</sup> Illustrated, for example, by contrasting the broad ecological aspirations of the report on the *State of the Forest, 2016* with some of the detailed guidance which purports to implement the Code of Forest Practice.

There are various ways in which the Nova Scotia government could do this. We have recommended that it should begin by re-thinking the *Forests Act* so that the exploitive element is diminished and rendered comparable to the ecological responsibilities implied in other legislation. Above all, revision should impart a strong mandate for stewardship. This might even extend to separating the allocation function from the determination of what resources could be made available for harvesting. In this scenario a commission would be responsible for presiding over the actual allocation of cutting limits to competing enterprises, but the stewardship department would establish long-term policies for forest management and, in light of those policies, decide where harvesting would be allowed and how it should be carried out. The commission would be confined to deciding which enterprises should be awarded cutting rights on specific sites.

### **Recommendation 3. Recognize that strong economic and scientific data support major change in policy on Crown land.**

#### ***Science and economics call for forest policy change.***

Recognize that there are strong economic and scientific data that support a major change in policy. Ensure that biological sciences influence stewardship policy and that landscape level factors – not narrow stand-level considerations - drive harvest decisions.

DNR has been strongly criticized for its fallacious use of ‘science’. One document is prominent in any discussion of the disjunction between the scientific advice that DNR receives and the application of harvesting practices. This is the draft report “Forest Disturbance Ecology in Nova Scotia” (7 February, 2007) by Neily, Quigley, Stewart and Keys. The report was an attempt to quantify disturbance ecology of forest regions in Nova Scotia with the intent to apply this knowledge as a science-based approach to harvesting methods. This draft report was heavily criticized in a 23-page letter submitted by academics from Dalhousie, St. Mary’s and Acadia universities<sup>5</sup> as unscientific and biased towards supporting clearcutting. Its principal flaw being that it overstated, even misrepresented, the frequency and extent of ‘natural disturbances’. The draft report was minimally revised and in April, 2008, was released by DNR under the title “Mapping Nova Scotia’s Natural Disturbance Regimes” authored by Neily, Quigley and Stewart.

Neily *et al.* (2008) identify four disturbance categories:

- **Frequent** “the time interval between stand initiating events typically occurs more frequently than the longevity of the climax species that would occupy the site”. This constitutes 43% of the landscape.
- **Infrequent** “the time interval between stand initiating events is typically less frequent than the longevity of the climax species that would occupy the site” This constitutes 24% of the landscape.
- **Gap dynamics** “Forests that are rarely exposed to stand initiating disturbances characteristically develop overstories that are sustained by processes of canopy gap formation that encourage understory development and overstory recruitment, sustaining an essentially intact forest canopy.” This constitutes 27% of the landscape.
- **Open Seral** “terrestrial ecosystems have site conditions (edaphic) that restrict or limit tree growth.” This constitutes 6% of the landscape.

Given the conclusions from this document 43% of the forested landscape could be clearcut every 50 to 100 years, 24% of the landscape can receive some form of selection harvesting and 27% should never be clearcut, though single trees could be removed with the proviso that this maintains intact forest canopies.

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<sup>5</sup> Drs. Adl, Beazley, Bondrup-Nielsen, Freedman, LaPaix, Richardson and Stacier.

While these conclusions, derived from research by DNR's own scientists, gave too much latitude to exploitive forestry, the Department's actual approach to harvesting far exceeded even these limits. This point has been made in other submissions to the Independent Review, particularly by Professors Beazley and Patriquin, who conclude that according to the work of Neily *et. al.*...

... selection harvesting in areas of infrequent and/or gap disturbance would simulate the natural disturbance on 51% of the landbase while some form of even-aged management (EAM) (clearcutting, shelterwood harvest, variable retention, commercial thinning) would simulate disturbances on the 43% of the landbase subject to frequent disturbance regimes.

However selection harvesting comprises less than 10% of the Crown land harvests and EAM regimes are applied on the remainder... So the percentage of selection harvesting is less than 1/5<sup>th</sup> of what it should be, while the percentage harvested for EAM is approximately twice what it should be.

Thus the claim that '(currently) all harvest treatments are aligned with the nature-based requirements of Nova Scotia's lands'<sup>6</sup> appears to be inconsistent with NSDNR's own figures.<sup>7</sup>

This assessment appears in a submission to DNR by the Halifax Field Naturalists and is part of a lengthy and detailed analysis of 'the various documents that NSDNR cites as providing a scientific basis for its forestry policies and practices.'<sup>8</sup> The submission praises some of the Department's scientific work, but finds that the best is often not reported and that 'scientific evidence and procedures developed outside of NSDNR that should be applied to forestry in Nova Scotia are apparently not being applied.'<sup>9</sup> DNR's reluctance to provide the public with easily accessed information about recent forest inventories also raises serious concerns about the state of our forests and the appropriateness of current policies.

Findings like those reported by the Halifax Field Naturalists not only give the lie to government (and DNR) aspirations to and claims for transparency, they suggest that DNR defies the basic principles of scientific research and sound policy making. Professor David Patriquin, who was a principal author of the Field Naturalists' submission, has commented, in a separate letter to the Independent Review, that 'the relative isolation of the science staff in the NSDNR Resource Management Division is an overarching issue' and that 'there is very little interaction of the science staff... with the larger scientific community or with the public.'<sup>10</sup>

### ***Publicizing the connection between science and policy***

We recommend:

- The Department be required to establish designated research funds for enquiries into forest management and policy issues; to issue public tenders for designated projects and projects proposed by researchers and to publicize the awarding of project grants.
- The Biodiversity Science Advisory Committee, or another advisory board, selected in consultation with professional bodies in forestry and science and composed of external and in-house scientists, should review all applications for projects, including in-house applications and also review mandatory progress reports.

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<sup>6</sup> Goal 13, DNR, *Five-year Progress Report on the 2011-2020 Natral Resources Strategy Report* FOR-2016-4. Aug. 16, 2016.

<sup>7</sup> Halifax Field Naturalists. Conservation Committee. 'Impacts of forestry in Nova Scotia on conservation of biodiversity: Concerns and Questions: A submission to Nova Scotia Department of Natural Resources', April 19, 2017. p. 10.

<sup>8</sup> *Ibid.* p. 18.

<sup>9</sup> *Ibid.*

<sup>10</sup> Letter D. Patriquin to Prof. William Lahey, 'Comments on NSDNR forestry science...' September 18, 2017, pp. 2-3.

- Forest management guides should be reviewed by the advisory board. High priority should be given to reviewing existing guides and revising them to reflect current science in biology and forest management.
- Research reports should be reviewed by the advisory board and submitted to peer-reviewed journals.
- All reports should be available to the public.
- Similarly forest data should be available to the public, on the Department website, in accessible forms.
- To facilitate the incorporation of up-to-date forest science into management plans, the Department should ensure that all research reports are available for circulation across the department and should be formally presented to departmental personnel and the public on a regular basis.

Economic data and research should be treated in similar fashion. It should be transparent, objective and readily available, in accessible forms, to the public.

Greater access to data and to scientific research would certainly enhance the knowledge base of the policy communities surrounding the Department. A more certain and more profound understanding of forest conditions and forest policies would also enhance debate over forest policies. But neither of these developments would ensure that biological sciences influence stewardship policy and that landscape level factors – not narrow stand-level considerations - drive harvest decisions. Here again legislative revision could be helpful if it reduced the authority of the forest resources group and accorded comparable influence to units concerned with species at risk, biodiversity, and restoration forestry.

The influence of science could be augmented further if the department were to establish and/or make greater use of advisory bodies. There is no guarantee, of course, that such bodies would be independent either of political or economic interests. Transparency would be of some help: Public notices might invite applications from qualified people, appointments (and the reasons for them) could be published as could the minutes of meetings and recommendations to government.

Similarly consultation with environmental, industry and civic groups could be institutionalized so that departmental plans could be reviewed routinely and transparently.

#### **Recommendation 4. End policies that exploit resources on Crown land.**

Impose a moratorium on clearcutting and two-stage clearcutting on Crown lands. Stop treating Crown lands as reserves for private mills. End intensive forest management and ban the export of unprocessed wood and wood chips.

##### ***Declining employment...***

The decision to harvest trees is strictly economic. There is no scientific reason for cutting trees down. The argument that harvesting is science based is only true to the extent that we have applied science to minimize or maximize some aspect of the harvesting process. Science is a way of knowing and can only be applied to very specific and often narrow questions. Understanding broad issues based on science requires amalgamating answers to multiple questions potentially modeling system behavior. When we apply science to an activity such as forestry there will always be a human driven concern such as maximizing extraction of the resource while causing an acceptable amount of ecological impact over a given period of time. Current clearcutting practice in Nova Scotia, with a long-term average of 45,000 ha (1990 to 2015) clearcut per year, means that forest stands will not get older than 44 years. It is limited how large even a fast growing tree of the Acadian forest will grow in 44 years and it will consist primarily of early succession species such as red maple and balsam fir. Thus, the clearcutting policy in Nova Scotia will result in the quality of the forest diminishing and the possible diversity of forest products declining. In fact, it is difficult to envision the forests in the future being suitable for much more than being chipped.

From 1936 to 1966 an average of 2.5 million cubic metres (m<sup>3</sup>) of wood were harvested according to DNR. This increased to 4 million m<sup>3</sup> by 1980, which again increased to over 6 million m<sup>3</sup> by 1997 leveling off until 2005 and then decreasing to 3.5 million m<sup>3</sup> by 2016. The area harvested as indicated by data from Stats Canada available from 1990 shows the same pattern with an increase from about 40,000 ha, a leveling off at 55,000 ha (2.8% of the non-restricted operable land base) and then a drop just over 30,000 ha (1.5% of the non-restricted operable land base). The volume of wood removed per hectare between 1990 to present has been constant at about 100 m<sup>3</sup> per hectare, however employment adjusted for either area harvested or amount of wood removed has been dropping continuously especially since 2003 probably a function of increased mechanization. Stats Canada data show clearly that total employment in forest industries peaked in the late nineties and early two thousand at 10,000 to 12,000 people; at present it is at 5,500. The only place where employment has increased, adjusted for the amount of area harvested, is in the wood product manufacturing industries and to a small extent in support activities for forestry.

In other words, there is potential for employment in the value added sector, but only if we allow the trees to grow.

### ... *Devastated woodlands*

While industrial forestry has damaged rural employment, it has devastated forest ecosystems. Clear-cutting eliminates seed sources of local, original tree species and exposes the forest floor to sunlight. It impoverishes soils, dries up streams, and causes poor quality tree species to regenerate. Nutrients are washed or blown away, while soil fungi that promote tree growth die. Nature's naturally-established regeneration patterns are turned upside down.<sup>11</sup>

Nova Scotia has some of the poorest soils for clearcut forestry in all of North America and Europe. Even without clearcuts, because we receive acid rain from the industrial heartlands, forest soils over more than 50% of our landmass are losing more nutrients than are being replaced by nutrients in rainfall and by weathering of rocks. SW Nova Scotia is in the worst shape. Unlike most other regions in eastern North America which are beginning to recover following 50% reductions in sulfur emissions over the last 30 years, surface waters in many watersheds of SW Nova Scotia continue to acidify. Dissolved calcium has fallen below levels critical for survival of many species of aquatic life and toxic forms of aluminum have reached levels that kill fish. Toxic forms of mercury also increase as acidity increases. Atlantic salmon were simply the most sensitive and first to go. Declines in other fish species and fish predators, such as loons, will surely follow.

Clearcutting exacerbates the effects of acid rain by increasing nutrient losses even further through their direct removal in wood and bark. There are more losses through erosion and leaching on land laid bare. Clearcutting the poorest lands in SW Nova Scotia watersheds will reduce forest productivity, while clearcutting the nutrient rich drumlins will further weaken highly stressed aquatic ecosystems. At some point, soil calcium becomes sufficiently low that tree health is affected and re-growth following clearcuts is slowed. Some species are affected more readily than others, e.g., sugar maple decline has been attributed to acid rain induced soil-calcium deficiency. Recent evidence suggest that declines in soil calcium in forests of eastern North America are affecting other species including some salamanders, herbs, invertebrates and song birds. There should be no clearcutting whatsoever within watersheds stressed by acid rain.<sup>12</sup>

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<sup>11</sup> Bob Bancroft Draft Letter to editor 23 Feb 2017.

<sup>12</sup> David Patriquin. Draft for article: 'Last stand for forestry' April 14, 2016

Forestry practices in this province do not take into consideration the specific needs of woodland plants so clearcutting an area will inevitably destroy plants ranging from mosses to orchids, and many will not return for decades until the right complement of fungi, soil nutrients, companion plants and trees are established, a process that may take a hundred years or more, and may not occur at all. This is what is implied when we speak of the loss of biodiversity. And with the current clearcutting regime, plants and animals with specific habitat needs will never return to those areas.

Forest-linked wildlife species deserve serious consideration. This is simply not happening. Animals dependent on old growth conditions (e.g., fisher, pine marten, goshawk, Atlantic salmon, woodland caribou) are now rare or extirpated. Ten forest-dependent species are listed as provincially endangered, and another five as “threatened” and “vulnerable.” Many more forest-dependent species, while not officially listed under the *Endangered Species Act*, are assessed as ‘rare’ or ‘potentially at risk’. Our landscapes are falling silent as forest songbird populations decline, their breeding habitat flattened. The provincial government and the forest industry are actively turning their backs on the stewardship of nature and species at risk. In his 2016 report the Nova Scotia Auditor General criticized DNR for not meeting all of its responsibilities to conserve, protect and recover endangered species. He found no recovery or management plans for five of nine endangered or threatened species. The remaining plans were six months to more than seven years late. Three of five vulnerable species did not have management plans. There were no recovery teams for four of nine endangered or threatened species (listed under Endangered Species Act and solely provincial responsibility). Four recovery plans for these species were past due for review by one to four years. Pointedly, the Auditor General noted a 2006 research study on the threats to endangered species in Canada, which indicated that loss of habitat is a factor in approximately 84% of species at risk. He added that ‘protection of habitat goes beyond protection of endangered species individually to that of their supporting ecosystems.’<sup>13</sup> For example, invertebrates, such as insects, are often ignored as components of forested ecosystems although they have a greater ecological role than do birds and mammals. We tend to regard deadwood as a waste in forest ecosystems but there are hundreds of species of fungi and beetles that depend on deadwood and serve the important ecological role of returning nutrients to forest soil<sup>14</sup> With intense forestry many of the so-called saproxylic beetles are endangered. In Sweden, for example, where beetles are better known than in North America 500 species have been red-listed due to forestry practices. In Nova Scotia we do not even know how many species there are in our forests<sup>14</sup>. The study by Kehler et al. <sup>14</sup> investigating saproxylic beetles in Nova Scotia found that deadwood volume was associated with stand age in softwoods, and it appears that over 140 years is required for deadwood volume to reach pre-disturbance levels.

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<sup>13</sup> Nova Scotia. Auditor General. ‘Report, 2016’, p. 52.

<sup>14</sup> Kehler, Bondrup-Nielsen and Corkum 2004, BEETLE DIVERSITY ASSOCIATED WITH FOREST STRUCTURE INCLUDING DEADWOOD IN SOFTWOOD AND HARDWOOD STANDS IN NOVA SCOTIA, PROC. N.S. INST. SCI. Vol. 42:227-239.

*... call for urgent remedies.*

Loss of biodiversity and the depletion of forest soils have become serious problems, but that does not mean that we cannot have biodiverse, economically productive forests. Witness the few old growth stands that we still have and successful cases of multi-aged management for hardwood timber. There are even growing markets for non-timber resources from our forests. But it does mean that we cannot clearcut our forests again and again without penalty. Prudence demands that we institute the following reforms:

- A reduction in forest harvesting throughout NS is essential in the near-term for restoring healthy and diverse forests.
- To restore public confidence, revise the definition for 'clearcutting' to be scientifically valid. Ban clearcutting on Crown lands and in watersheds that are being severely impacted by acid rain.
- Encourage partial harvest techniques through economic incentives that provide protection (*e.g.*, shading) to forest soils to retain nutrients. Partial harvests must become the norm in the Acadian forest to ensure more high quality, late successional (shade tolerant) trees are grown that will support a diversified forest economy including a stronger saw log economy.
- Expand the Community Forest Model across a much greater portion of the Crown lands. This is one of the very best ways to put our public lands back into the hands of a knowledgeable public in a way that benefits communities and local businesses rather than a few mills.
- Landscape issues must have priority when allocation decisions are made.

## **Recommendation 5. Introduce the benefits of carbon off-sets.**

Introduce a strategy that will accord woodlot owners the economic benefits of carbon off-sets.

Well documented evidence of Earth's atmospheric CO<sub>2</sub> concentration and knowledge of the so-called 'Carbon Cycle', demonstrates that forestry practices in this province are in need of substantial reform.

The earth's 'Carbon Cycle' (<https://en.wikipedia.org/wiki>), the planet-wide system which forms the foundation of all life on Earth, is currently in a state of considerable flux, the like of which has never been witnessed by our species. The International Geological Congress (<https://en.wikipedia.org/wiki>) is considering adopting the term 'Anthropocene' to describe our era. An era in which human beings are significantly altering many of Earth's fundamental processes. Not since The Great Oxygenation Event, some 2.45 billion years ago (<https://en.wikipedia.org/wiki>) has a single life form been responsible for globally manipulating Earth's atmosphere; in that case it was the group of organisms known as cyanobacteria that were responsible for atmospheric transformation, causing one of the most significant mass extinctions in Earth's history. By wilfully manipulating Earth's atmosphere, we are entering uncharted territory for our species and the risks may be life-threatening.

A comprehensive understanding of how human-led deforestation alters the carbon cycle is difficult to achieve because so many of the variables involved are 'moving targets'. Given the complexity of how deforestation relates to the carbon cycle, it is difficult to quantify, precisely, how forest clearcutting contributes to the ongoing manipulation of Earth's atmosphere by humans. However, it is simple fact that human activities are, indeed, increasing global atmospheric CO<sub>2</sub> concentration (<https://www.esrl.noaa.gov/gmd>) and it is fact that forests are a significant 'carbon sink' for the planet, second only to Earth's oceans (<https://www.ncbi.nlm.nih.gov/>). Therefore, at a time when CO<sub>2</sub> sequestration is most urgently needed, to stem the warming of Earth's atmosphere, humans

should endeavour to conserve, and even grow, what is one of the most effective and natural carbon sinks the planet has: our forests. Instead, in recent decades, governments around the world have chosen to maintain traditional deforestation rates and, in many cases, increase clear cutting of forest lands (<https://rainforests.mongabay.>).

The following facts, define the intimate link between clearcutting and CO<sub>2</sub> sequestration in Nova Scotia:

1.) Approximately 90% of all forest land harvested in Nova Scotia, for the year 2015, was achieved through clear cutting (as defined by the National Forestry Database) (see: <http://nfdp.ccfm.org/da>) and (<https://www.halifaxexaminer.c>). This was consistent with the clearcutting statistics collected for the National Forestry Database since 1990. In "The Path We Share: A Natural Resources Strategy for Nova Scotia 2011–2020" (<http://novascotia.ca/natr/str>), DNR undertook to reduce clearcutting by 50%. Clearly the department had rejected that goal long before 2016, when the Government of Nova Scotia (<http://nationalpost.com/pmn/n>) formally abandoned it. There has never been a credible, scientifically supported explanation for doing so.

2.) Approximately 95% of any given tree's dry mass is derived directly from atmospheric CO<sub>2</sub> (<http://www.npr.org/sections/k>) and (<http://msue.anr.msu.edu/news/>). Clearly, there is a direct proportionality between the mass of an intact forest and the amount of CO<sub>2</sub> sequestered from the atmosphere, by that forest. A 'back of the envelope' calculation would estimate that every tonne of intact forest represents about 475kg of sequestered CO<sub>2</sub> (assuming a 50% moisture content for the living forest). It turns out that this value very closely matches a practical calculation (see below).

3.) Since just 1970, the forest industry in Nova Scotia has harvested an average volume of 4.34 million cubic meters, annually (total 'net merchantable' roundwood harvested, private and Crown lands combined) (see: <http://nfdp.ccfm.org/dy>.)

Given these facts, and the application of some basic arithmetic, the mass of carbon dioxide sequestered in a given volume of living forest in Nova Scotia can be easily calculated:

Taking the average (mean) annual volume of forest harvested in Nova Scotia, between 1970 and 2015 (from #3 above), a reasonable estimate for the mass of this harvested wood can be determined by averaging the round wood equivalents (RWE) for a variety of both deciduous and coniferous species (<http://www.fao.org/3/a->, Table 7). This average value turns out to be approximately 974kg/cubic meter, at 50% moisture content. Accounting for the mass of water present in this value, the corresponding value of dry wood mass per cubic meter harvested would be 487kg (974kg\*0.50).

Given that the dry mass of any tree is comprised of approximately 95% CO<sub>2</sub> (#2 above), it can be demonstrated that every cubic meter of forest harvested in Nova Scotia represents about 460 kg of sequestered atmospheric CO<sub>2</sub> (487kg\*0.95). (It is worth noting that the difference - approximately 3% - between the mass value of the estimate in #2 (475kg) and the value just calculated (460kg), can likely be attributed to the fact that the average annual harvested volume - 4.34 million cubic meters/year - represents the volume of 'net merchantable' wood harvested, i.e. not including waste wood that did not make it to market. However, a conservative figure of 460kg is used here.

Applying this value to the average yearly forest harvest in Nova Scotia (#1 above), the resulting mass of sequestered CO<sub>2</sub> equals 2007385625kg (460kg/cubic meter \* 4.34 million cubic meters, or approximately 2 million tonnes/year.

This conveys the ongoing scale of harvest in this province and demonstrates that this harvest is, indeed, fundamentally linked to the sequestration of a significant amount of atmospheric CO<sub>2</sub>.

It is clear, then, that the concentration of CO<sub>2</sub> (and other greenhouse gases) in Earth's atmosphere is increasing, at a rate unprecedented in human history and that, at the same time, Earth's forests provide one of the most effective, significant, and natural means of CO<sub>2</sub> sequestration possible.

Given these facts, why is the government of Nova Scotia not taking concrete measures to reduce the rate of deforestation in this province? Why does the government not recognize that no natural disturbance agent removes as much forest biomass as is currently removed through clearcut harvests.

Here is what should happen:

- We must recognize that forest biomass electricity is an inefficient, non-green energy source and we must eliminate primary forest biomass from the list of renewable electricity sources. It follows that we must decommission existing biomass electricity plants.
- We should use forest biomass only as localized energy sources for 'space heating' rather than for electricity. (*Biomass provides 3-4 times more energy as heat than it does as electricity.*) and we should support community co-operative energy groups that obtain/store surplus electricity from solar, wind, tidal, or hydro sources.
- Legislation should ensure that 'full-tree' harvesting does not take place under any circumstances. Only removal of stem wood is acceptable. Regulations should prohibit buyers from purchasing biomass containing branches, foliage and tops.
- The export of wood pellets should be banned.
- A system of carbon off-sets should be introduced, enabling the Crown and woodlot owners to benefit from retaining standing timber.

## **Recommendation 6. Introduce policies that reward stewardship and conservation.**

Encourage [ecologically sensitive harvesting](#) and foster [non-timber forest products](#). Such changes can reverse the decline of employment in our woods.

Selection management is an environmentally appropriate alternative to clearcutting. It is a traditional approach that appears to be regaining popularity. Its broader use has been impeded by a belief that the larger harvesters are not suited to selection management and that it is not productive enough to recoup investment in much harvesting equipment. Recent experience shows that harvesters can be used in selection management.<sup>15</sup> Costs remain a problem. Nevertheless, as more woodlot owners opt for selection management, contractors may develop the skills they need to work in that setting. They may also acquire lighter, less expensive, equipment.<sup>16</sup>

Government can foster this trend in the following ways:

***A moratorium on clearcutting on Crown land.*** If our earlier recommendation were adopted, mandatory use of selection management on Crown land would certainly encourage contractors to acquire the skills and equipment needed for less aggressive harvesting.

***Education programs, perhaps including short-term bursaries.*** Re-training would be needed for harvester machine operators for selection cutting, species optimizing, working with machines and tree marking. Training is

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<sup>15</sup> See 'Chips and Slabs – Harvest demo' *Atlantic Forestry Review* November 2017, pp. 8-10.

<sup>16</sup> See ??? *Atlantic Forestry Review* 2016???

needed for tree markers,<sup>17</sup> and for monitors and inspectors who would work with and coordinate tree markers with harvester machine operators.

**Tax incentives**, such as higher depreciation allowances, could be used to encourage a shift to lighter equipment.

**An equipment loan fund** offering favorable interest rates could be set up by the mills to replace the arrangements that we believe currently sees mills guarantee, or provide, loans to contractors and truckers. The loans should be free of any company requirements to meet specific harvesting and delivery quotas. Government could make *pro rata* participation in the fund mandatory for mills allocated timber on Crown lands.

**Enhance the sustainable forest program.** The Association for Sustainable Forestry (ASF) manages funds, collected through the Registered Buyers Program, to support silviculture. Funds come from the registered buyers program and so are sensitive to fluctuations in harvesting<sup>18</sup>. Currently treatments tend to perpetuate recent borealization of the forest.<sup>19</sup> To convert areas back to Acadian forest species, the program would have to offer incentives encouraging hardwood planting and regeneration, tree release and pruning. To do this and to prepare for changes anticipating global warming, more generous funding is needed and might be acquired through higher Crown land stumpage rates, a hike that would create a more level playing field in the N.S. forest industry. Reduced subsidies for roads could also provide funding for enhanced silviculture.

We support the following recommendations made by DNR's own scientists for enhancing hardwood representation in the working forest:

To increase the proportion of quality hardwood, progress needs to be made in (i) setting specific management goals to enhance quality hardwood growth, (ii) prescribing appropriate treatments, after gathering required stand information, (iii) implementing these treatments effectively and in an economically feasible way and (iv) assessing the quality of treatments after completion.<sup>20</sup>

**Short term programs in pre-commercial thinning (PCT).** There is an industry view that selection management cannot be generally adopted until the current over-supply of young age classes and the predominance of pioneer species is dealt with. Some believe that this can be achieved if Nova Scotia follows the Finnish practice of encouraging biomass operations that supply heat to local facilities, or even small communities.<sup>21</sup> This may be practical under a long-term forest management schedule that prioritizes a distribution of older age classes across the working forest. However, great care has to be taken to avoid committing to significant quantities of biomass to co-gen facilities and pellet production, since both of these can encourage the burning or chipping of higher value timber.

**Make good stewardship pay.** The best way to encourage ecologically sensitive harvesting practices in our working forests is to make them economically attractive. Strategies are needed to develop private businesses, co-operatives, and allocation and marketing structures for both hardwoods and softwoods and to add value to currently underutilized and low priced species such as white spruce and larch. For example, the current trend toward imported composite structural components should be critically reviewed, with the intention of promoting quality local wood solids for building structures. At the same time appropriate regulations, such as amendments to

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<sup>17</sup> NSCC or the Forest Technician Program are the obvious providers. Alternatively the Canadian or Ontario Tree Markers Association has offered to run training courses in N.S.(? Check w. Neil.)

<sup>18</sup> For example, the table at p. 76 of the *State of the Forest 2016* indicates that silviculture treatments in 2015 were applied on 18,109 ha. and in 2002 on 36,066 ha. in that year the harvest volume was 6,066,274 cubic metres, and in 2015 it was 3,748,496 cubic metres, 61.8% of the area treated in 2002. See *ibid.*, p. 74.

<sup>19</sup> In 2015 about 30% of treatments involved softwood regeneration 'because over 85% of all forest products acquired ... were from softwood tree species.' (State of the Forest 2016, p. 40)

<sup>20</sup> Tim McGrath, Timber Management Group, DNR 'Tolerant Hardwood Management Guide' Forest Research Report. Report FOR 2007-6. No. 84. Updated Feb. 23, 2017, p. 2. ([www.novascotia.ca/natr/library/forestry/reports/Reports84.PDF](http://www.novascotia.ca/natr/library/forestry/reports/Reports84.PDF).)

<sup>21</sup> Sinclair report

the Building Code could ensure that Nova Scotia homes and buildings are built out of Nova Scotia wood. Currently only a small proportion of Nova Scotia's hardwood stands are suitable for sawlogs and veneer, but 'with proper management it can be increased'.<sup>22</sup>

### ***Promote Value-Added Forest Products***

Much could be gained from government policies that foster value-added forest products, promoting the creation of small businesses and small-business collaborations which would create new forestry-related technology, products, and jobs in Nova Scotia. In 2008, GPI noted that between 1998 and 2004 Manitoba had become the leading province in adding value to its forest products. In the same period Nova Scotia had dropped from fifth place to ninth, recording \$127 per cubic metre of wood harvested, in 1998 and \$107 in 2004. GPI noted that Manitoba had achieved the growth of its value-added from \$123 per cubic metre to \$425 by making an explicit commitment to promoting value-added business operations, implementing programs that linked urban buyers to loggers and kiln operators with furniture and cabinet makers.<sup>23</sup>

***Promote non-timber forest products.*** From maple syrup to pharmaceuticals there are many products that can be derived from healthy forests. Very few of these can be obtained from cutover lands.

All too often the few economists who do look at NS forest issues focus entirely on harvesting, producing, marketing and employment on the woods products side of the forest economy. However, there are other aspects of our forests that influence the economy. Tourism is the most frequently mentioned, but non-timber products – e.g. food and pharmaceutical products - should also be considered.

## **Recommendation 7. Take tourism into account.**

Recognize that tourism based on our beautiful forested land and seascape brings employment to Nova Scotia's rural areas. According to Tourism Nova Scotia tourism is a \$2.6 billion industry (2013) Tourism GDP is larger than the combined GDP of mining, agriculture and forestry. Tourism in 2012 employed 23,000 full-time workers and 15,000 part-time employees for a total of 38,000. In comparison 5,500 people are employed in forestry. Tourism has been increasing year after year and it is estimated that by 2024 tourism will reach \$4 billion in revenues.<sup>24</sup>

Tourism Nova Scotia, a 'sector-led' Crown corporation had a budget of more than \$22 million in 2016-17. Some \$12 million was spent on marketing. We are concerned lest that investment be wasted because extensive clear cutting, which has an impact on viewscapes across the province, should make the province less attractive to Canadian and international travellers. We re-iterate our recommendation that clearcutting be banned on Crown land. We also recommend that:

- the Department encourage private woodland owners to adopt selection management techniques, particularly in areas highly dependent on tourism.
- The Department, the Department of Transportation and Tourism Nova Scotia work closely to minimize the impacts of industrial harvesting close to parks and to areas where wilderness tourism is viable.

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<sup>22</sup> McGrath, 'Tolerant Hardwood....', p. 1. In 2004 hardwood trees accounted for 30% of merchantable growing stock, but only 4% were valuable for sawlogs and veneer (Townsend, 2004). Since 2004 the demand for biomass may have reduced the proportion further. Certainly, as we have noted, that demand spelled the end of two hardwood flooring businesses.

<sup>23</sup> Linda Pannozzo and Ron Coleman 'Application of the Genuine Progress Index to Nova Scotia: GPI Forest Headline Indicators. Update' GPI Atlantic 2008. pp. 32-33.

<sup>24</sup> Scotia (<https://tourismns.ca/sites/default/files/2017-01/Tourism%20Impacts%20Fact%20Sheet%20FINAL%20February%208%2C%202017.pdf>)

## Afterword

In 2002 Jack Ward Thomas, Chief of the US Forest Service during the Clinton administration, warned Canadian foresters that the public debate over forest policy that was seen in the US during the 1980s and 1990s could also influence the forestry profession in this country. Reviewing American battles over clearcutting and other aspects of intensive forestry, he drew the conclusion that...

Once the citizens of a democracy realize that they – in the final analysis – are the owners of the public lands, they will seek an increasing role in the management of those lands. Further, if the concerns of those citizens are ‘blown off’ by professional land managers and politicians, they will respond by organizing to magnify their political impact through educational efforts and direct political involvement.<sup>25</sup>

He added that:

1. In the end, there are professional prerogatives that will not exist unless sanctioned by the people at large;
2. Decisions are, over the long-term, determined by the majority of the minority of people who care deeply about an issue;
3. Then, in the democratic process, decisions are determined by those who show up.

The Healthy Forest Coalition is but one part of a public movement that will eventually achieve forest policy reform in Nova Scotia.

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<sup>25</sup> Jack Ward Thomas ‘Are there lessons for Canadian foresters lurking south of the border?’ *The Forestry Chronicle* May/June 2002. Vol. 78, No. 3, 382-387.