New Brunswick Crown Forests:

Assessment of Stewardship and Management

New Nouveau Brunswick CANADA

New Brunswick Forest Products Association

Association des produits forestiers du Nouveau-Brunswick

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Preface

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The New Brunswick Department of Natural Resources and Energy (DNRE) and New Brunswick forest industry (licensees of Crown forest land in New Brunswick) are currently reviewing objectives, management policies and procedures related to the stewardship and management of New Brunswick Crown forests.

The New Brunswick Forest Products Association (NBFPA) and New Brunswick DNRE have requested JP Management Consulting to conduct an expert, independent assessment of stewardship and management by benchmarking New Brunswick forest policy and management with other relevant fiber-producing regions around the world.

The JP Management Consulting (JPMC) project will provide the Client (NBFPA and DNRE) with a common platform for formulating a comprehensive overall strategy aiming at fullfilling as optimally as possible government, industry and other stakeholder targets in the management of Crown forests.

Norman Lord Doug Parsonson

Executive Summary

New Brunswick's forests are carefully managed to provide productive, protective and social functions for the long-term benefit of New Brunswickers. Today, 20% of the Province's gross domestic product* (GDP*) depends on a vital forest industry sector. A tightening softwood fiber supply has prompted the Department of Natural Resources and Energy (DNRE) and forest industry to commission this report to identify the potential for improvement in the stewardship and management of New Brunswick's forests.

Long term potential

By applying existing management practices more widely, New Brunswick can essentially double its long-term supply of softwood for commercial use while meeting all other environmental and social objectives for Crown Land usage. It will take approximately thirty-five years to create this economic potential. One of the key findings in the global benchmarking of forestry policies and practices was that Finland sustainably harvests sixty-five per cent (65%) more wood than New Brunswick per hectare of forestland.

While the stimulus for this study and much of this report is focused on the spruce/fir timber supply, we believe that with management, the long term supply and quality of hardwoods and other softwoods such as white pine, red pine and cedar can also be improved

The benchmarking analysis shows where the Government of New Brunswick (the Province) and industry can change current management practices to double softwood timber supply. Firstly, the Province must elevate timber supply for commercial use to a primary objective in the management of Crown Lands as it is in other major softwood jurisdictions. This will ensure that fair and reasonable trade-offs are made between economic, environmental and social priorities in the future. Secondly, annual spending on silviculture must increase in the coming decades from the current level of $23 million budgeted for 2001 to approximately $34 million estimated based on current unit costs and an expanded program. When compared to the current management permitted by the DNRE, the area planted would double to approximately 40% of the Crown Forest area and 18% would be pre-commercially thinned. These and other supporting changes will put New Brunswick on a course to doubling the economic potential of its forests.

Immediate issues and opportunities

Between now and 2035, the forest products industry is facing a flat supply of softwood timber, that may decline if other new non-timber objectives are introduced. During the past several years, the Province has implemented leading-edge policies and advanced management planning tools to allocate land uses. Habitat and non-timber conservation objectives have been met by reducing the annual allowable cut (AAC) on Crown Lands without identifying alternative supplies.

* Forest Industry GDP Share calculated as the value of forest industry production (primary processed products) at mill as a percentage of Provincial/National GDP

Executive Summary (cont.)

The Province and the forest products industry can act now to preserve and expand the economic role of the forests in New Brunswick's economy. The largest, near term opportunity lies in the management of Special Management Zones. Compared to international standards, New Brunswick has high levels of protected areas and special management zones (32% of Crown Land). In the current planning period, harvesting in these areas could be increased by 250,000 cubic meters per year if DNRE provided complete access within current regulations and the industry paid the higher costs of operating in these areas. Beyond this, there may be substantial volumes of softwood in these special management areas that may serve no environmental purpose and are at risk of loss through natural causes. The Province should intensify its monitoring of environmental and social objectives to ensure that the economic value of this fiber is not lost unnecessarily.

DNRE and the industry can also reduce the cost of forestry management to make the sector more viable. New Brunswick has relatively high staffing levels compared to other regions (Ontario and Quebec). These other regions may provide a useful model of how industry and government have streamlined roles and responsibilities to eliminate overlap. Adoption of internationally accepted certification schemes by New Brunswick will also help the Province and the industry to be more focused and efficient.

Conclusion

The Province's forest industry sector can continue to be a major contributor to the local economy if it has strong support and leadership from Government. Some of the changes needed for short and long term viability of the forest industry will be controversial. We recommend the public be given more opportunity, as it is in other jurisdictions, to participate in revising current objectives for Crown lands in accordance with the proposed changes.

Recommendations

- A timber supply objective should be set for each license area that would be binding on the Government and on the licensee. Timber supply objectives should be set for the range of species harvested commercially from each license. This would include a feedback loop to evaluate timber supply implications of DNRE management changes.
- The industry and DNRE should jointly fund and support research and development of science-based forest management practices applicable in New Brunswick.
- The public should participate in reviewing the objectives of management for New Brunswick's Crown lands to provide a mandate for the direction and magnitude of change in forest management.
- The DNRE should reduce overlap in management and oversight of Crown lands. Ontario provides a model on how industry/government responsibilities have been streamlined.
- Special management zones should be critically reviewed and where possible additional harvesting permitted. These areas should be managed using the best science to meet habitat and timber supply objectives.
- Conservation values of private lands should be taken into account when evaluating the need for set asides and special management on public lands. This should include a process to establish a form of voluntary conservation designation on private industry lands (and woodlots).

Key Findings

Benchmarks

- Relative to New Brunswick, Finland sustainably harvests five times the wood from three times the area. Finland's experience demonstrates that focused efforts can achieve a significant change within 40 years. The industry in Finland has had the confidence to invest based on an environment of increasing timber supply.
- Not all the policies and methods employed in Finland were optimal. Practices such as drainage of wetlands have caused long-term harm to non-timber values and the country is working to mitigate the problems that have arisen.
- New Brunswick has leading edge policy objectives and advanced management planning tools to allocate land uses spatially and over time to achieve quantifiable habitat and non-timber conservation objectives on Crown Lands. In some instances these objectives go beyond those employed in the benchmarked areas.
- Over 32% of New Brunswick Crown Lands are in some form of protected area or special management zone.
- New Brunswick Crown Lands management roles and responsibilities structure is the most complex of the benchmarked regions, which adds cost and blurs accountability. New Brunswick has relatively high staffing levels versus equivalent regions (Ontario and Quebec). Ontario provides a model of how industry/government responsibilities have been streamlined to eliminate overlaps and costs.
- Adoption of certification schemes by New Brunswick forest industries offers the prospect of reducing overlapping oversight responsibilities and reducing costs.

Key Findings

Wood Supply

- New Brunswick's forest industry sector contributes approximately 20% of the Province's GDP* – this critical part of the economy is at risk if competitiveness is eroded due to a lack of investment. Investments are unlikely if timber supplies are static for prolonged periods.
- A high level of dependence on Crown timber supplies and lack of a **primary** timber supply objective for Crown lands puts New Brunswick's forest industry sector at a disadvantage relative to competitors.
- New Brunswick's forest industries have fully utilized almost all available softwood timber AAC, and under current management Crown forest softwood timber supplies will be static until 2035.
- Possible additional spruce and fir AAC may be available before 2035 by more actively managing special management zones. Management has been inconsistent among licensees and among DNRE regions. Lack of management leads to unmet timber and non-timber objectives. During the current planning period, up to 250,000 m^3/year AAC could be available if these areas were harvested to the level permitted under the DNRE's current regulations.
- It is possible to almost double the long term softwood supply for industrial purposes while meeting the current non-timber objectives for Crown land in New Brunswick.
- Hardwood supplies from Crown land will be maintained With appropriate active management, the quality (and quantity) of hardwood logs will increase.
- The doubling of softwood supply will require additional investments in planting. Silvicultural costs increase from $23 million budgeted for 2001 to just over $50 million/year, but tapering to an estimated $34 million/year long-term. Under this scenario, over the next 80 years approximately 40% of the Crown Forest area would be planted and 18% would be pre-commercially thinned, versus 21% and 24% respectively under current management .
- The area of clearcut harvest is projected to remain at or near current levels under both scenarios. Increased harvest volumes will come from thinning or partial cutting operations.

* Forest Industry GDP Share calculated as the value of forest industry production (primary processed products) at mill as a percentage of Provincial/National GDP

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Glossary of Terms

Allowable Annual Cut (AAC): The volume of wood governments allow companies to cut each year. The setting of the allowable harvest volume is an important part of any forest management plan. The main factor in calculating the allowable harvest is the volume of timber that may be harvested during a given period to maintain sustained production.

Allowable Cut Effect: the immediate increase in sustainable AAC attributable to a particular action or strategy that is expected to provide increased growth and future wood supply.

Age class: any interval into which the age range of trees, forests, stands, or forest types is divided for classification. Forest inventories commonly group trees into 20-year age classes.

Biodiversity (biological diversity): the diversity of plants, animals, and other living organisms in all their forms and levels of organization, including genes, species, ecosystems, and the evolutionary and functional processes that link them.

Clearcutting: the process of removing all trees, large and small, in a stand in one cutting operation.

Commercial Forest: Forest where any legal, economic, or specific environmental restrictions do not have a significant impact on the supply of timber. Corresponding term is forest area available for timber supply.

Commercial thinning: a silviculture treatment that 'thins' out an overstocked stand by removing trees that are large enough to be sold as products such as poles or fence posts. It is carried out to improve the health and growth rate of the remaining crop trees.

Critical wildlife habitat: part or all of a specific place occupied by a wildlife species or a population of such species and recognized as being essential for the maintenance of the population.

Critical winter range: forested habitat, usually stands of mature or old-growth conifers, which provides deer and elk with resources critical to survival during severe winters.

Crown Lands: all or any part of the lands vested in the Crown that are under the administration and control of the Minister and includes any water upon or under the surface of such lands.

DNRE: Department of Natural Resources and Energy.

Ecosystem: a functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size-a log, pond, field, forest, or the earth's biosphere-but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem, old-growth ecosystem, or range ecosystem.

Fertilization: the addition of fertilizer to promote tree growth on sites deficient in one or more soil nutrients. Also used to improve the vigor of crop trees following juvenile spacing or commercial thinning.

Glossary of Terms

Fine filter approach: an approach to maintaining biodiversity that is directed toward particular habitats or individual species that might fall through the coarse filter. These habitats may be critical in some way and the species threatened or endangered.

Forest land: Land with tree Crown cover (or equivalent stocking level) of more than 10 per cent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ.

Forest management: the practical application of scientific, economic and social principles to the administration and working of a forest for specified objectives. Particularly, that branch of forestry concerned with the overall administrative, economic, legal and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation.

Growing stock: Volume of standing timber or number of standing trees in a forest.

Herbicide: chemical substances or living organisms (called bioherbicides) used to kill or control vegetation such as brush, weeds, and competing or undesirable trees.

Hardwoods: trees which are generally deciduous, broad leafed species such as maple, birch and aspen.

Habitat: the place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.

JPMC: Jaakko Pöyry Management Consulting.

Licensee: the holder of a Crown timber license.

Planting: establishing a forest by setting out seedlings, transplants or cuttings in an area.

Pre-commercial thinning: a silvicultural treatment to reduce the number of trees in young stands, often carried out before the stems removed are large enough to be used or sold as a forest product. Prevents stagnation and improves growing conditions for the remaining crop trees so that at final harvest the end-product quality and value is increased.

Private lands: means lands other than Crown Lands and other lands vested in Her Majesty. Also means “freehold lands.”

Private woodlots: all forest land except: Crown Lands; forest land owned by a person whose principle business is the operation of a wood processing facility; forest land consisting of an aggregate of five thousand hectares owned by one person.

Productive forest land: forest land that is capable of producing a merchantable stand within a defined period of time.

Protected areas: areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage.

Public involvement: the procedures for obtaining and considering the views of the general public in planning and decision-making processes.

Royalty: the amount payable to the Crown for timber harvested on Crown Lands as prescribed by regulation.

Sedimentation: the process of subsidence and deposition by gravity of suspended matter carried in water; usually the result of the reduction of water velocity below the point at which it can transport the material in suspended form.

Silviculture: the art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

Glossary of Terms

Softwoods: cone-bearing trees with needle or scale-like leaves such as spruce, fir, cedar and pine.

Soil disturbance: disturbance caused by a forest practice on an area covered by a silviculture prescription or stand management prescription including areas occupied by excavated or bladed trails of a temporary nature, areas occupied by corduroyed trails, compacted areas, and areas of dispersed disturbance.

Specially Managed/(Restricted) Forest Land/Area: Includes forest which belong to IUCN protection categories III and IV + other specially managed areas where timber supply is restricted for a special purpose. (IUCN III = Natural monument; protected area managed mainly for conservation of specific natural features) (IUCN IV = Habitat/Species management area; protected area managed mainly for conservation through management intervention). Also includes other specially managed areas where timber supply is restricted for a special purpose. New Brunswick includes mature coniferous habitat (OSFH) and deer wintering and watercourse buffer zones. Some of these forest stuctures may move location over time, whereas these types of structures in other jurisdictions are primarily in fixed areas.

Stream: a watercourse, having an alluvial sediment bed, formed when water flows on a perennial or intermittent basis between continuous definable banks.

Strictly Protected Forest Land/Area: Includes forest which belong to IUCN protection categories I and II (IUCN I = Strict nature reserve/wilderness area; protected area managed mainly for science or wilderness protection) (IUCN II = National park; protected area managed mainly for ecosystem protection and recreation). New Brunswick includes national parks, provincial parks, protected areas, ecological reserves, and conservation areas.

Sub-licensee: the holder of a Crown timber sub-license.

Tending: any operation carried out for the benefit of a forest crop or an individual thereof, at any stage of its life. It includes operations both on the crop itself and on competing vegetation but not site preparation or regeneration cuttings.

Timber: all trees of any species or size whether standing, fallen, cut or extracted.

Watercourse: a natural stream or source or supply of water, whether usually containing water or not, such as a lake, river, creek, spring, ravine swamp, and gulch.

Watercourse protection buffer: the land, together with the vegetation that supports it, immediately in contact with the stream and sufficiently close to have a major influence on the total ecological character and functional processes of the stream.

Wildlife management: the application of scientific and technical principles to wildlife populations and habitats to maintain such populations (particularly mammals, birds and fish) essentially for recreational and/or scientific purposes.

Introduction

New Brunswick's forests are the province's most valuable natural resource. The Provincial Government's objective is to manage Crown forests to provide the productive, protective and social functions for the long-term benefit of New Brunswickers. Benefits delivered include protection of biodiversity, soil and water resources; tourism and recreation settings, aesthetic values and hunting; and production of timber to support the province's economic development through the forest industry sector.

The forest products industry sector is a very important part of the economy of New Brunswick. Industry data indicate direct employees number more than 15,000 people, with more than 13,000 additional jobs supported indirectly. The annual payroll of $925 million makes the industry a major employer, especially in smaller towns and villages. Annual sales total more than $4 billion making the forest products industry a major force in the Province's economy. This sector alone accounts for 40% of the province's exports.

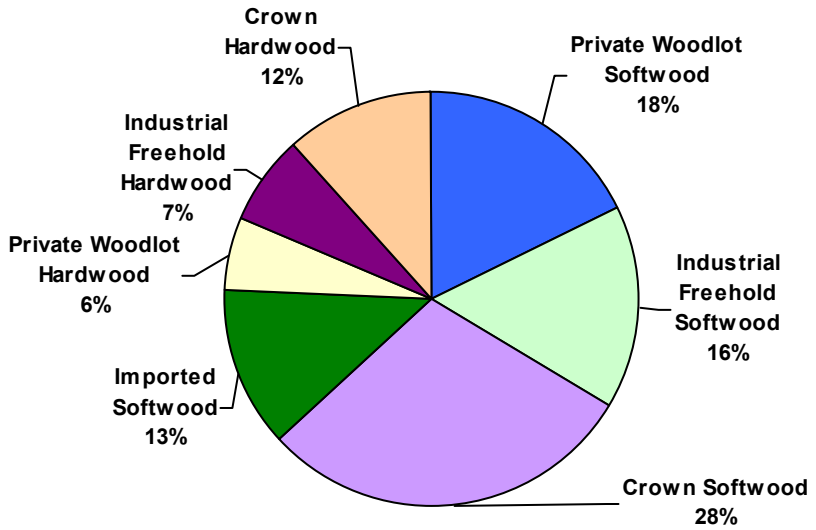
Maintaining this key sector of New Brunswick's economy requires ongoing investments in sawmills, pulp and paper mills, harvesting machines and other factors of production. Industry data show that over the last 10 years the industry has invested more than $3.4 billion in plant expansion, modernization and other improvements. In addition, the Provincial Government invests over $23 million annually in replanting a portion of harvested areas and in other forest renewal activities to enhance the regrowth of the natural forest established after harvesting.

Recent five-year management plans have been developed by the Crown Land licensees in accordance with the goals and objectives published in the Department of Natural Resources and Energy (DNRE) document "A Vision for New Brunswick Forests" (dated December 1999 and revised March 10, 2000). Under the new plans, timber production from Crown Lands is less than in earlier plans. This outcome has led the licensees, represented by the New Brunswick Forest Products Association (NBFPA), to request a review of the Vision document, and to add a specific objective for timber production along with the other objectives for wildlife and biodiversity. This request and other recommendations made by NBFPA raise fundamental questions about DNRE's Vision Statement.

New Brunswick Timber Supply Context

Why is the timber supply from Crown Lands so important?

- Source of Fiber Consumed in New Brunswick -



Source of Fiber	Softwood (million m^3)	Hardwood (million m^3)
Private Woodlots	2.1*	0.7*
Industrial Freehold	1.9	0.8
Crown	3.5	1.4
Import	1.5	Minor
TOTAL	**9.0**	**2.9**

* Does not include volume of exported fiber from this landbase

The Crown Lands supply just under 50% of the total timber from New Brunswick, or 40% including imports.

Of the remaining sources, several are likely to decline in the short- to mid-term.

- Softwood imports of 1.5 million m^3 will decline as adjacent regions come to terms with declining softwood inventories and harvesting levels.
- Private woodlots are a key source of timber for local industry. Current softwood harvests are more than 500,000 m^3 above estimated sustainable levels. Increased silvicultural investments can substantially increase future harvest levels.

Consequently, the timber supply from Crown Lands is of critical importance to the Forest Products industry, and to the Province's economic base. The noted decline in timber production from Crown Lands triggered NBFPA's request to review Crown Land management.

DNRE supported NBFPA's initiative to have an expert, independent consulting firm conduct a benchmarking assessment of forest management objectives, policies and practices in New Brunswick in comparison with other relevant countries/regions around the world. JP Management Consulting (North America) Inc. (JPMC) was awarded the contract to undertake this assignment, and the following report presents the findings of our work.

Hardwood and Other Softwood Timber Supply

While concern about the spruce/fir timber supply was the stimulus for this study, approximately 1/3 of the wood processed in the province is hardwood. In addition, there is a small but important harvest of softwood species other than spruce/fir.

The hardwood harvest is processed by a growing hardwood industry in the Province producing a wide range of products. More than thirty facilities rely upon hardwood as a raw material. Each of these plants is very important to their local communities. On a province wide basis, there is still a small surplus of hardwood available, however quality logs are in short supply, and there are local and regional shortages of a variety of products and grades. In some instances, private woodlots are being overcut to supply both hardwood and softwood.

Similarly, there are more than 25 facilities in New Brunswick reliant upon white pine, red pine, cedar or hemlock for a significant part of their fiber supply. Local communities are dependant upon the viability of these plants. There is a risk that management driven by the desire to maximize spruce/fir yields could reduce harvests of these other species, to the detriment of the industries and communities dependent on them.

The scenario developed and explained in the next part of the study did not explicitly address yields of these species. However, in keeping with sustainability objectives, maintaining yields of these species is an important outcome of forest management.

Study Objectives

The study assesses the potential for improvement in the development, allocation and management of timber resources on Crown Land in New Brunswick and identifies sets of changes (scenarios) that illustrate how to make change happen.

The specific objectives were to:

- Benchmark policies and practices for stewardship and management of New Brunswick's forests with other regions in North America, Nordic countries, and other relevant timber-producing regions
- Identify the potential for improvement in New Brunswick
- Prepare scenarios for improvement in New Brunswick
- Determine the conditions for success for each scenario

The focus of this project was on Crown Land in New Brunswick and consequently, recommendations for change in current policies and practices must comply with the Crown Lands and Forests Act. In accordance with the Crown Lands and Forests Act, the Crown forest licensees are committed to ensuring that Crown Land is managed in a sustainable manner, based on objectives established by the DNRE. Within this commitment, both parties wished to explore the economic potential of Crown Land forests in New Brunswick. In determining this potential, four key questions were addressed:

1. Can long-term wood supply for industrial purposes be increased within the current objectives for Crown Land usage in New Brunswick?
   - If so, how?
2. Are the current objectives for habitat protection, wildlife, water protection and biodiversity appropriate?
   - Are the methods by which these objectives are being achieved appropriate?

(continued…)

Study Objectives (cont.)

3. How do the objectives for New Brunswick's Crown Land compare with other jurisdictions?
   - Do other jurisdictions have specific objectives for wood supply for industrial purposes?
   - Are licensees in New Brunswick at an advantage or disadvantage with respect to wood supply?
4. Should DNRE change its current objectives, policies and procedures?

In addition to these specific questions, the project addressed competitive practices related to:

- Reserves and with non-timber primary objectives
- Harvest availability and yields from "constrained" forest zones
- Roles and responsibilities
- Management costs
- Types and security of tenure
- Types of accountability, liabilities and performance guarantees
- Level of government and industry staff, admin. & bureaucracy
- Role of third-party audits
- AAC levels (per hectare)
- Areas and levels of planting and intensive forest management
- Forecasts of growth and yield (per hectare) for differing intensities of management (passive, planting, pre-commercial thinning, etc.)

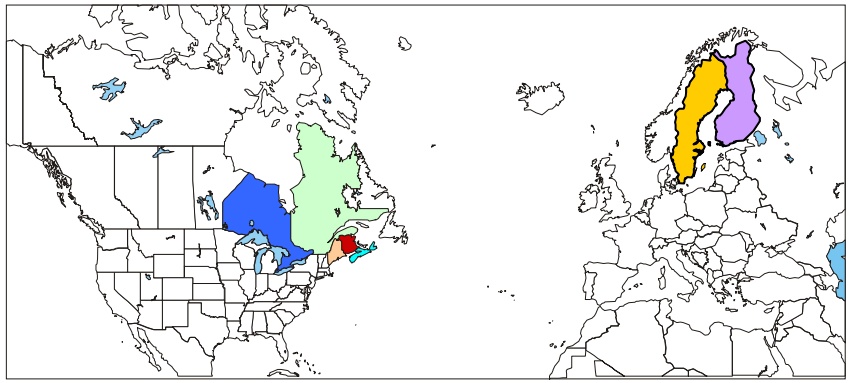
In undertaking the study, Jaakko Poyry consulted with a cross-section of parties interested in forest management in New Brunswick. In addition, a workshop was held to present some preliminary materials and to seek additional comments.

2.0 Benchmarking

- Benchmark Regions
- Case Study: Finland
- Forest Policy Objectives Benchmarks
- Protected Areas Benchmarks
- Roles, Responsibilities and Control Benchmarks
- Wood Supply Objective Benchmarks
- Industry Competitiveness Benchmarks

Benchmark Regions

Benchmarking was used to identify opportunities for New Brunswick to improve its performance. We have termed these opportunities "gaps."



Finland: World's Best Boreal Forest Productivity

Sweden: World's Best Boreal and Mixed Temperate Forest

Quebec:
Ontario:
Maine:
Nova Scotia:
Neighbouring and Competing Regions

New Brunswick:

New Brunswick's Crown Forests were benchmarked against the world's most productive boreal (Finland and Sweden) and mixed temperate forest (Sweden); and against neighbouring regions – Maine, Nova Scotia, Ontario and Quebec.

Finland and Sweden were analysed in more detail as case studies to illustrate the following:

- The most advanced boreal and northern temperate hardwoods forest management practices, how they are planned, implemented and the outcomes
- How directed change was achieved at a national scale
- Lessons to be learned from unintended consequences of forest management changes

The case studies are not offered as blueprints recommended for New Brunswick's forests. However, the experience gained provides useful guidance for New Brunswick's decision makers by highlighting the objectives, processes, outcomes and lessons learned from the forest management change processes in these two countries. Of the two case studies, the Finnish case is summarized in the following section.

Case Study: Finland
Policies to Increase Forest Productivity

Relative to New Brunswick, Finland sustainably harvests five times the wood from three times the area. What can New Brunswick learn from this experience?

Policy Milestones	
1917	Regulation on Prevention of Forest Destruction
1928	Private Forest Law and Forest Improvement Law
1930	Expansion of Operation of Forest Associations
1950s-1960s	Rapid Expansion of Industrial Wood Consumption
1964-1975	Intensive Forestry Programs (MERA-period)
1975-1982	Forestry Committee
1985	Forest 2000 Program
1994	Environmental Forestry Program
1997	Revision of Forest Laws
1999	National Forestry Program (NFP)

Finnish policy development shows a transition from initial moves to protect forest from destruction, to moves to encourage improved management through programs to organize owners and to raise productivity, to the present day where production and conservation policies are being fine-tuned.

Throughout this process, successive Finnish governments have recognized the critical importance of the forest sector to the Finnish economy. Consequently, while the majority of forests are privately owned, public resources have been used to improve forest productivity via loans, grants and provision of planning support.

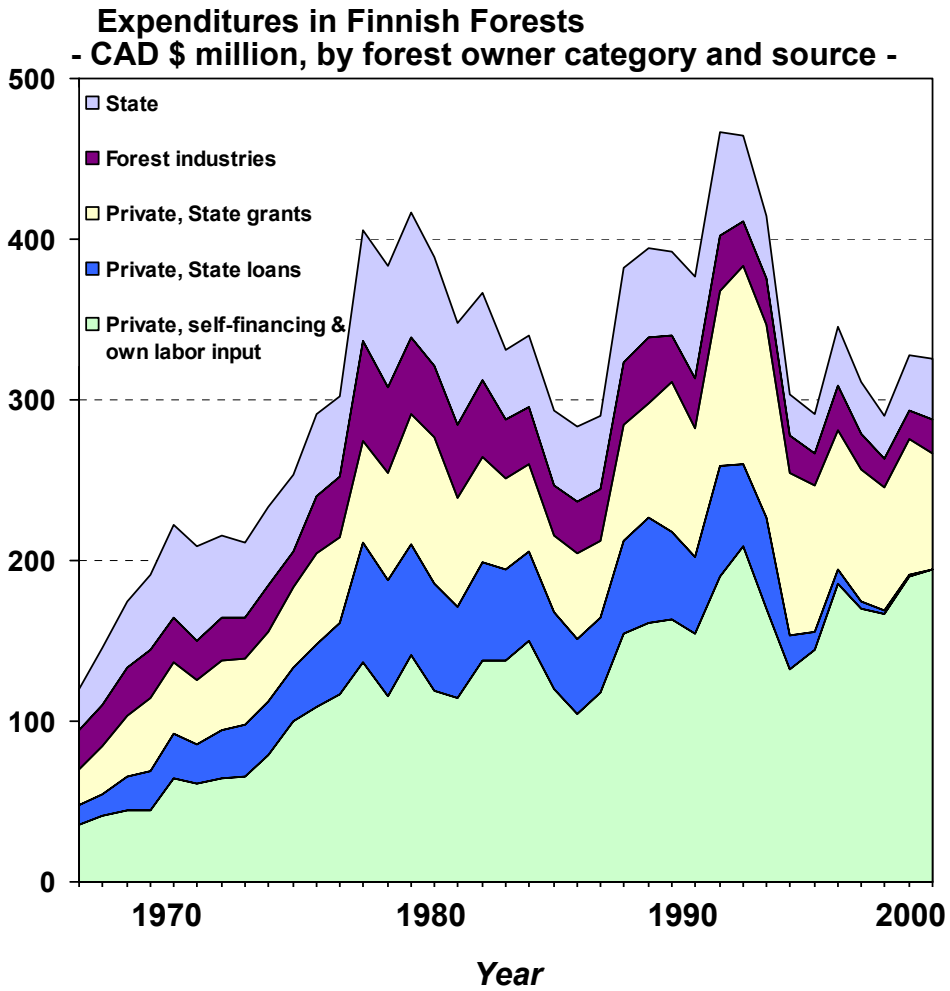
The intensive forestry programs since the 1960s reflect Finland's recognition of a timber supply shortage similar to New Brunswick's situation in 1982. The difference being that Finland has significantly increased the harvest potential from its forests while New Brunswick has not.

The investments in Finnish forests now average $300 million/year, or $15-17/hectare (ha)/year. An equivalent investment level on the province's Crown Lands would require $45 million/year versus the current $23 million/year.

Preconditions for investments for private owners have been high price expectations and tax deductibility of costs. For industry, a key motive has been to create more timber under their control. For the state, a growing timber supply is critical to sustaining a viable industry.

Finland: Investments in Forest Productivity

Finland's significant investments in silviculture have been made by private individuals, the state and industry. While most timberlands are privately owned, all key stakeholders have assumed their role in assuring future timber supplies.



For areas designated as "softwood dominated forest", investments have raised average productivity on Finnish forests to 2.9 cubic metres (m3)/ha/year versus the 1.8 m3/ha/year achieved on average in New Brunswick. These figures reflect growth of softwood and hardwood trees. New Brunswick should have a higher growth rate than Finland's because of its better growing conditions (temperature, soil fertility and growing season). This represents a "gap" that experience suggests can be closed while maintaining other values.

With an assured fiber supply from domestic sources, plus additional imported fiber, Finland's forest industries have invested in new capacity. Note that a portion of this growth requires additional imports of wood.

Industry has been able to invest in new capacity based on predictable flows of logs with the species, and size (diameter and length) characteristics known. This has allowed more specialization as industry seeks to direct each segment of the wood flow to its highest and best use. Increased productivity of the forests has been captured via increased production and value adding – Paper and Paperboard three (3) times, Sawmilling two (2) times (1970-2000).

Finland: Lessons Learned

Focused efforts can achieve a significant change within 50 years. Within an environment of increasing fiber, industry has the confidence to invest and an ability to pay for fiber, thus encouraging growers.

Significant change can be achieved.

Application of more intensive silviculture has resulted in 50% increase in wood production in a 50-year period and has clearly contributed to expanding the forest industry capacity in Finland. During the same time, growing stock has also increased significantly, meaning that industry's needs will continue to be met.

Key factors that led to widespread application of more intensive forest management in Finland included:

- The forest sector accounts for just under 15% of Finnish GDP, which motivated funding of nationwide programmes.
- Clear committment of major stakeholders (private forest owners/Government/industry)

What would Finland do differently?

Increasing and sustainable wood production was clearly the main objective of Finnish forest policy until the 1980s. Management emphasis has since shifted to increasingly focus on protecting and enhancing conservation and recreation values. The more recent trend of having forests certified is an added impetus in this direction.

In retrospect, not all the policies and methods employed were optimal. Some have caused long-term harm to certain non-timber values, and Finland is working to mitigate the problems that have arisen.

- There are practically no natural forests in southern Finland, and few areas of old forests and forests with dead wood. New areas are being identified and managed to promote these values.
- Draining wetlands increased the area of productive forests, but caused some negative side-effects, including destruction of valuable wetlands and degradation of some watercourses.
- Changes in the forest has put pressure on some game animals, but favored others.
- Planting programs favored pine over spruce, and hardwoods (birch and aspen) were considered undesirable. In the interim, Finnish industry's wood needs have evolved, so more spruce, birch and aspen are required, and these species are being favored in new planting programs while imports make up the deficit.

Forest Policy Objectives Benchmarks

New Brunswick has specific policy objectives and advanced management- planning tools to allocate land uses spatially and over time to achieve quantifiable habitat and non-timber conservation objectives on Crown Lands.

Generally, the Crown forest policy objectives of New Brunswick address the same issues as those of other international jurisdictions, as well as within Canada. The similarities within Canada are natural, due to the national (forest policy) framework set by Canada Forest Accord, national forest strategy, the national approach to forest certification.

A global trend in forest policy development during the last two decades has been the increasing importance of environmental and social sustainability objectives in addition to the ”traditional” wood production objectives.

A unique feature of New Brunswick Crown forest environmental policy objectives is that they are quantifiable, measurable, transparent, and outcome-based, while in many other jurisdictions forest policy objectives are expressed as statements of principle or broad objectives. Another clear policy difference relative to most other benchmarked regions is that in New Brunswick wood production is a secondary objective to be maximized after environmental objectives are met. In other jurisdictions, environmental and wood production objectives are either equally important, or wood production is the primary objective.

It is our opinion, based on our knowledge of conservation-related strategies used in other jurisdictions, that the approach used in New Brunswick is a sophisticated and complex solution to the problem of allocating land use across a managed and unmanaged landscape. The system combines state-of-the-art tools, and the latest science, bringing these together in a way that will generate spatial and temporal patterns of areas available for protected areas, special management areas, and subsequently harvesting to meet the long-term goals in the Vision document.

As with any model, the outcome is driven by the objectives applied and the assumptions used. In the most recent modeling and AAC setting process measures that had been specified in the vision document were fully accounted for in operational planning. As a consequence, an additional 109,000 ha of productive forest was set aside in protected areas* plus additional areas within special management zones. Collectively, these changes reduced softwood AAC volumes by 250,000 m^3/year. However, short-term hardwood harvests increased by a net 200,000 m^3/year with some licences increasing and others declining.

* Protected areas encompass 143,000 ha of land of which 109,000 ha is considered productive forest (exclusive of ecological reserves, conservation areas, parks and other reserves).

Forest Policy Objectives Benchmarks (cont.)

Implementation of New Brunswick's quantified forest policy objectives and practices on Crown Lands is being refined, based on experience. Active management of special management zones is needed to maintain forest structure, habitat values and timber production.

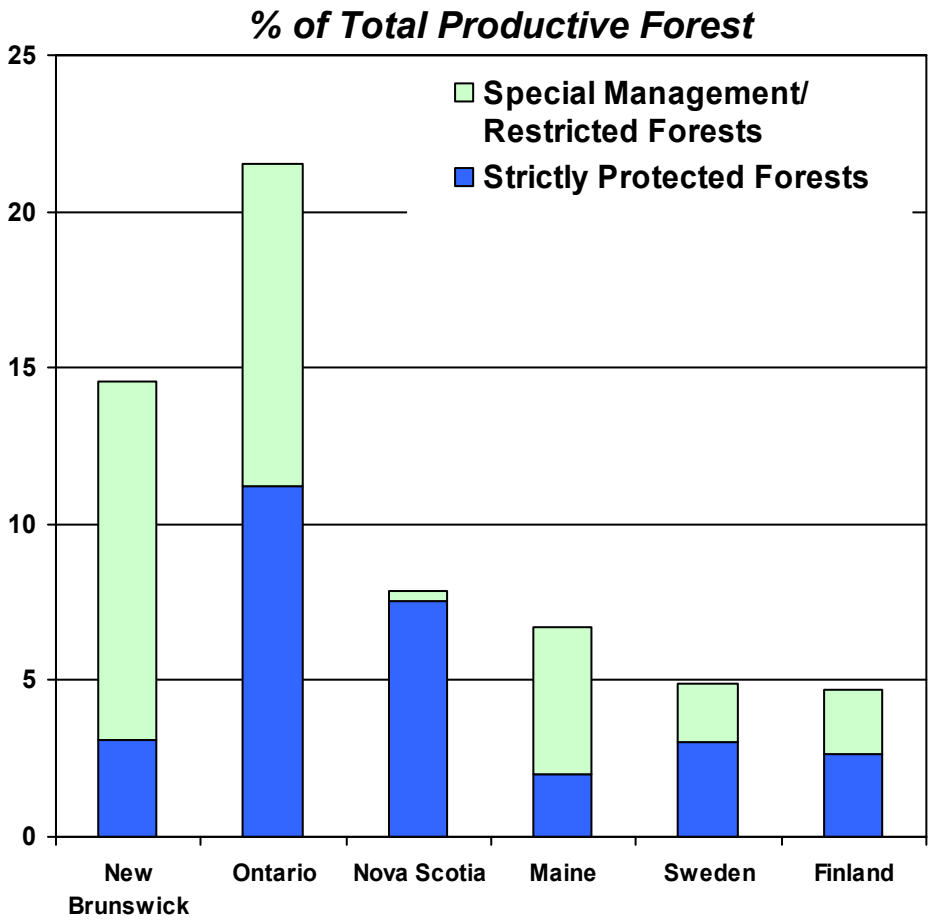
While there are no established tests for what is appropriate in terms of making provision for habitat protection, wildlife, water protection and biodiversity, the situation in New Brunswick appears to favor meeting these objectives at the expense of wood production. As noted earlier, there are no equivalent measures for comparing the types of habitat outcomes used in New Brunswick. However, watercourse protection buffer zones for the benchmarked regions are a point of comparison. With minimum 30-meter width buffers, the standards applying on New Brunswick Crown Lands are significantly wider than the 20m specified for most other similar regions.

All regions note the importance of maintaining a viable stand structure in these and other special management areas via controlled harvesting. However such selective harvesting in more sensitive areas can add significant cost to the extracted wood. When special conditions are placed on harvesting, companies often elect to forego the volume available from these sources due to higher costs of planning and executing harvesting operations within these areas. Under these circumstances, the timber is not recovered, but more importantly, forest stands within the buffers are not renewed except by uncontrolled events (fire, wind, disease etc.)

Watercourse Protection Buffer Measures							
	New Brunswick	***Finland***	***Sweden***	***Nova Scotia***	***Ontario***	***Quebec***	***Maine***
Watercourse Protection Buffer Zones	30 –150m, depending on characteristics of the watercourse	State land requires 15-30m, recommended on private land	No clear regulations "Buffer where needed"	20m-60m depending on slope	3m minimum	20m (60m on salmon waters)	0m – 75m depending on watercourse size
Type of Harvesting Permitted in Watercourse Buffer Zones	Partial harvesting allowed so long as it does not compromise the function of the buffer	Partial harvesting allowed, no soil disturbance within 20-30m	Variable practices	Partial harvesting allowed, no vehicles within 7m of stream	No harvesting near cold water streams, otherwise partial harvesting allowed	Partial harvesting allowed up to 5m from watercourse, no machinery within 20m	Partial harvesting allowed, special permits can be obtained if needed

Protected Areas Benchmarks

Over 32% of New Brunswick Crown Lands are in some form of protected area or special management zone.



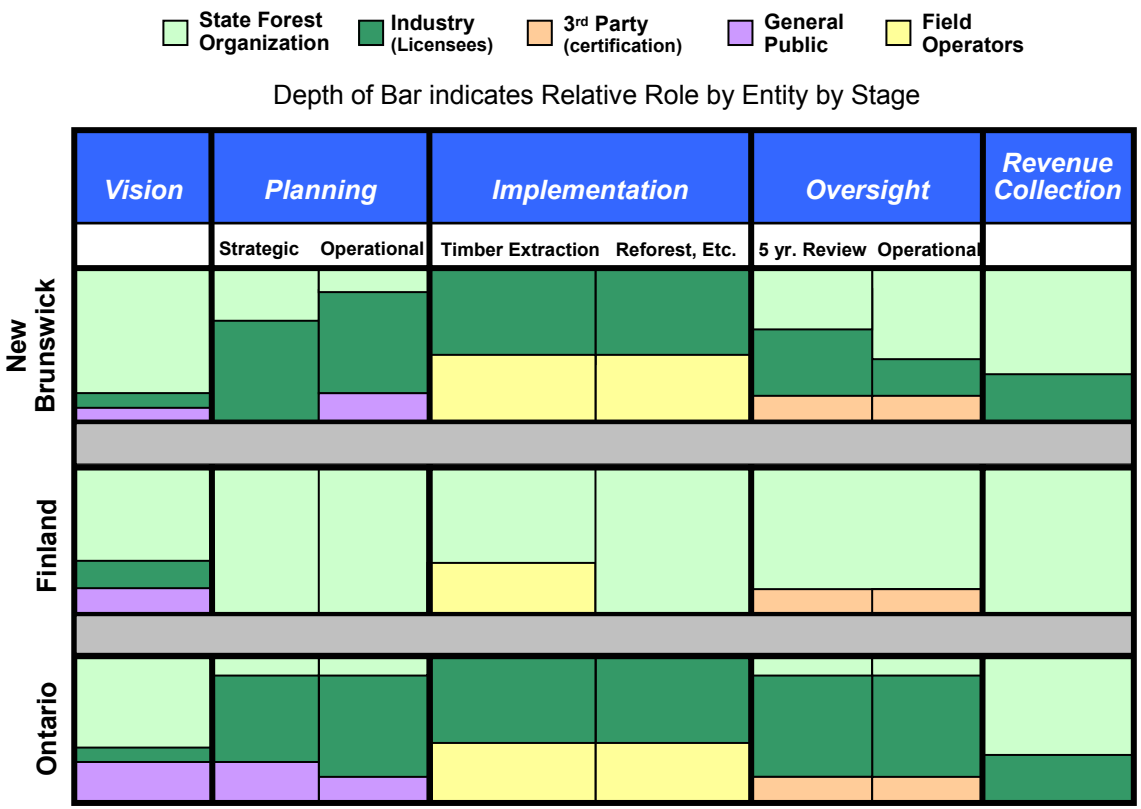
New Brunswick's unique program protects forest composition and selected sites, including:

- Habitat specific sites are included with representative areas covering identified communities.
- Forest structures are protected, with some reserved areas moving over time to capture age-related changes.
- Careful planning can lever critical habitat values of set-aside areas to enable animals to exploit the habitat values of the surrounding production forest. The more selective New Brunswick approach contrasts with the "broad brush" methods of setting aside blocks of land in other jurisdictions.
- Higher quality forests are set aside. By contrast, other jurisdictions often preferentially set aside areas with low wood-production potential.

New Brunswick's wildlife management has been successful. Consistent with neighboring regions, populations of most species are viable with few endangered bird or terrestrial mammal species. However, deer populations are below historical levels in parts of the Province. New Brunswick has a current yield of 1.5 animals/1,000 ha/year, with a peak of 4.5 in 1985. The reasons for declining populations are unknown. However, deer populations can be maintained within intensively managed forest environments. Finland and Sweden, have harvest levels of 2.5 and 7.3 animals/1,000 ha/year respectively. Management to create conditions suitable for deer is an important aspect of the DNRE's objectives for Crown Land.

Roles, Responsibilities and Control Benchmarks

The structure of the New Brunswick Crown Lands management's roles and responsibilities is the most complex of the benchmarked regions, which adds cost and blurs accountability.



Implementation of the Crown Lands and Forests Act of 1982 (CLFA) was a watershed in the management of the Crown forests of New Brunswick. The CLFA clarified and redefined responsibilities among the DNRE and licensees and sub-licensees who would operate and obtain wood from Crown Lands. DNRE's responsibilities included establishing and communicating the goals and objectives for Crown Forest management to the licensees; and evaluating the licensees' performance from the perspective of controlled development of the forest over the long- term. The licensees' responsibilities included translating DNRE goals and objectives into management plans and then implementing them. DNRE was to exercise on-the-ground monitoring of environmental and wildlife habitat management practices to ensure they were done correctly. It would also undertake spot checks on harvesting and silvicultural operations to audit compliance with approved plans.

The consequence of this evolution is that New Brunswick now has the most complex set of management roles, responsibilities and control relationships of the Benchmarked regions. The matrix shows a schematic representation of the entities involved in each stage of the planning and implementation of forest management in New Brunswick, Ontario and Finland.

Roles, Responsibilities and Control Benchmarks (cont.)

Management of special management zones has been inconsistent among licensees and among DNRE regions. The implications are lack of management to maintain forest structure long-term, or to obtain approved harvest levels .

Based on our review, the roles assumed by DNRE and licensees have evolved away from those envisioned under the Act. DNRE has become actively involved in management planning and oversight of the implementation processes, for example, by placing "rules" on the management practices to be applied on a stand-by-stand basis. This blurring of roles has increased the total cost of forest management and has caused licensees' performance to be evaluated more on an activity basis than an outcome basis. This has also hindered licensees in their ability to maximize timber production off their licenses.

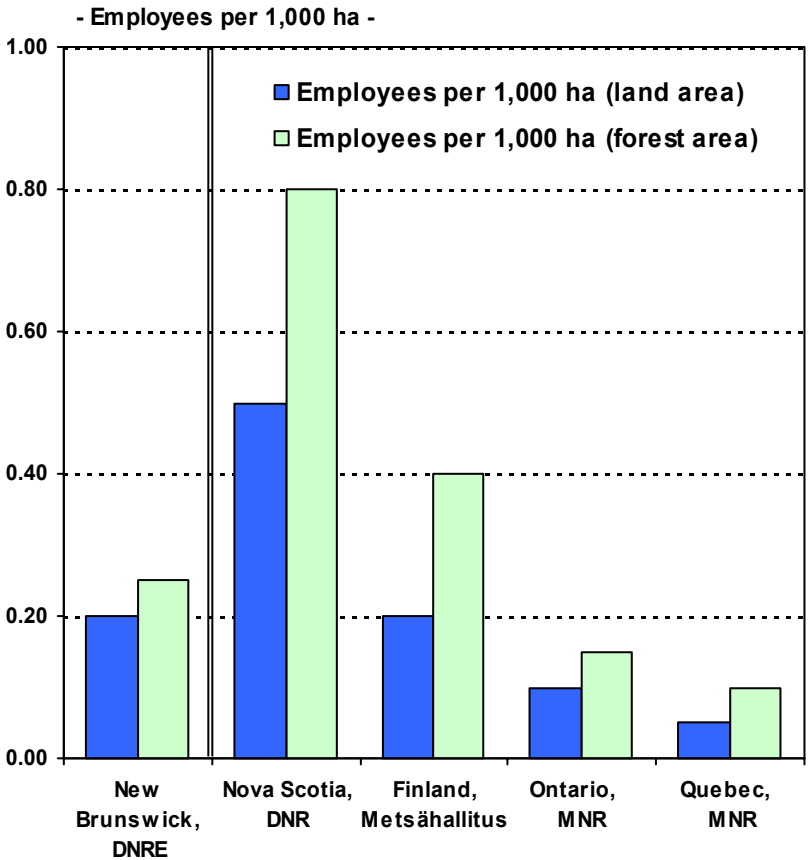
Anecdotal evidence from the stakeholder meetings and review of on-the-ground implementation of the tactical wildlife habitat protection measures indicates inconsistencies in how DNRE's "rules" are being applied. This has had a significant impact on the yields possible from special management zones. Appropriate harvesting is approved in the management plans; however, operations are prevented at the tactical level. In principle, overlapping responsibilities create inefficiencies in forest management and in employee productivity.

In contrast to New Brunswick, Ontario operates under a similar forest management model but avoids overlap by the Ministry of Natural Resources (MNR) focusing on setting the vision, and on responding to examples of malpractice by companies or operators on Crown Lands. The process of routinely reviewing performance has largely been outsourced to licensees' third-party certification auditors to reduce MNR oversight responsibilities, and to avoid replicating what has become a defacto requirement for doing business in the Forest Industry.

(continued…)

Roles, Responsibilities and Control Benchmarks (cont.)

New Brunswick has relatively high staffing levels versus equivalent regions (Ontario and Quebec). Ontario provides a model of how industry/government responsibilities have been streamlined to eliminate overlaps and costs.



Ontario has aggressively reduced government costs and minimized duplication where activities are undertaken by companies or other entities. The effect is significant, with approximately 70% fewer government employees per managed unit area than in the New Brunswick DNRE. Conversely, in Finland, Metsähallitus is directly responsible for all planning, implementation and oversight responsibilities. The Finnish model requires approximately 60% more government employees per unit area. However their responsibilities cover a much wider range of activities than DNRE's, including all planning, harvest supervision, replanting, and delivering wood to the road side.

The complexity of New Brunswick's model means that decision making, particularly in planning and oversight, is less efficient than in other competing regions. This is reflected in duplication of resources and ultimately, in costs. Certification costs are carried by the producer with no premium in the product price. Consequently, regions able to rationalize duplicated oversight will be able to reduce costs and/or re-deploy resources to more productive uses with a manageable downside risk relative to today's practices.

Roles, Responsibilities and Control Benchmarks (cont.)

Adoption of certification schemes by New Brunswick forest industries offers the prospect of reducing overlapping oversight responsibilities and reducing costs.

	Certification of Forest Managers on Public Lands by Scheme by Region				
Public Land Owner	***PEFC***	***CSA***	***SFI***	***FSC***	***ISO***
New Brunswick, DNRE		CSA, SFI, or FSC required by end of 2003	JD Irving, Nexfor Fraser Papers		Required by end of 2002 Nexfor Fraser Papers Bowater J.D. Irving UPM – Kymmene
Nova Scotia, DNR		Stora Enso	Stora Enso		Stora Enso JD Irving
Ontario, MNR		Weld-wood	Weld-wood	Domtar, Halburton F&WR, Weldwood	Abitibi-Consolidated, Domtar, Columbia Forest Products, Kruger, Tembec
Quebec, MNR					Abitibi-Consolidated, Bowater, Domtar, Gerard Crete et Fils, Kruger, Nexfor Fraser Papers, Norbord, Tembec
Maine, Bureau of Parks & Lands			2002, 485,000 ha	2002, 485,000 ha	2002, 485,000 ha
Finland, Metsähallitus	Yes (100%)				Yes (ISO 14001)
Sweden, Sveaskog				Yes (100%)	

Forest certification schemes have been developed to independently assure retailers and consumers that the products they buy come from sustainably managed forests. Having forests certified is becoming a precondition for selling into some key markets. In practice, there exists an array of (mostly) competing programs that differ in terms of the origins of the program, the standards applied and the requirements placed on forest managers and operators to obtain and then retain current certification status.

One area of common ground among the schemes is that plans are reviewed for completeness and adequacy against the certification scheme's criteria, and then the manager's on-ground performance is reviewed against the endorsed plan, with the results publicly available. Consequently, for licensees who are audited annually for plan implementation and onground practices, there is a case for ending duplication by DNRE staff in the oversight of these aspects of the licensees' performance monitoring.

This would require DNRE to accept certification auditors' reports as being an adequate level of due diligence in terms of meeting the Department's responsibilities under the Act. In our opinion, properly credentialed third party auditors could adequately fulfill this responsibility, allowing the DNRE resources to be redeployed, or overheads reduced.

Wood Supply Objective Benchmarks

A high level of dependence on Crown timber supplies and the lack of a primary timber objective for Crown lands puts New Brunswick's forest industry at a disadvantage relative to competitors.

State Forest Organization (% of total forest land)	*Timber Objective*
Ontario MNR (87%)	"long-term reductions in the supply of fiber necessary for processing will not occur"…"More intensive forest management practices are expected to offset any wood supply losses" – Ontario Forest Accord
Finland Metsähallitus (22%)	Metsähallitus is required to sell sufficient wood to fulfill financial and social targets. Two of five objectives in current National Forest Plan relate to wood production objectives.
Sweden Sveaskog (13%)	"Forest management shall result in a level of sustainable timber production that is higher than present"
New Brunswick DNRE (49%)	"To maximize the long-term economic benefits from the sustainable timber supply while meeting identified non-timber objectives"

Of the benchmarked regions, the public forests of New Brunswick, Ontario and Quebec comprise the largest proportion of the productive forest supplying the forest industry. These jurisdictions developed wood allocation methods with longer tenure (20 to 25 years) to encourage industry to invest in mills. In contrast, companies in regions with few public lands rely on open market timber.

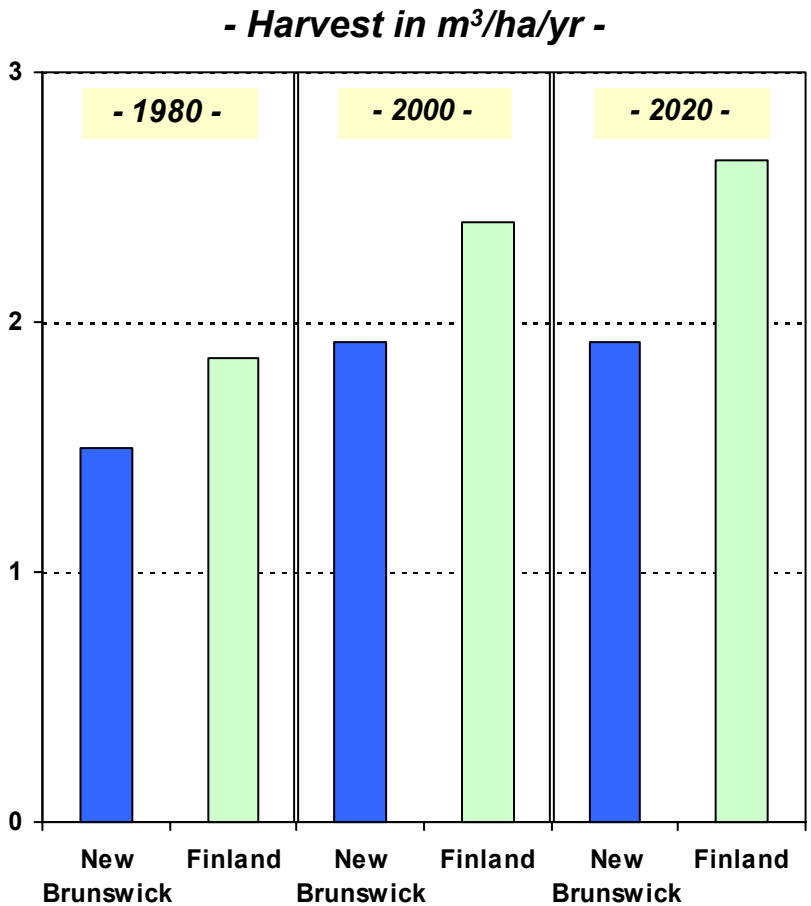
New Brunswick, Ontario and Quebec all have provisions in their timber allocation mechanisms that require industry to develop alternative, usually private, sources of wood to meet their full intake needs. However, because wood supply from public lands is such an important component of the total supply in these regions, successive governments and forest land management agencies have typically assured industry of continued access to the required volumes of wood, typically by controlling the level of harvest via Annual Allowable Cut (AAC) mechanisms.

In more recent years, New Brunswick, Ontario and Quebec have undergone land use allocation that has taken significant areas of public forest land out of production, thereby reducing AAC potentials. Ontario's Living Legacy program is a good example. Under this process, additional areas of production forest were set aside. The Government recognized the importance of the Crown timber supply and inserted an explicit timber production objective in the Ontario Forest Accord, such that the timber supply from Crown lands will not be reduced.

In New Brunswick, timber supply is an objective to be met after other objectives have been satisfied. Because no alternative untapped timber supplies exist, reductions in Crown Forest AAC in New Brunswick must lead to reduced production. Declining output is reflected in decreased employment, stumpage and tax revenue.

Wood Supply Objective Benchmarks (cont.)

Except for some higher–cost wood in special management zones, New Brunswick's Forest Industry sector has fully utilized all available volume and there are no additional volumes projected to be available in the mid-term under current management.



New Brunswick's lack of a primary timber supply objective has led to potentially sub-optimal outcomes from a timber supply perspective. For example, constraints have been placed on licensees' ability to choose planting over natural regeneration. Significant areas have also been taken out of timber production, with some decisions being made at local levels with no consequences being felt to account for adverse impacts on timber supply.

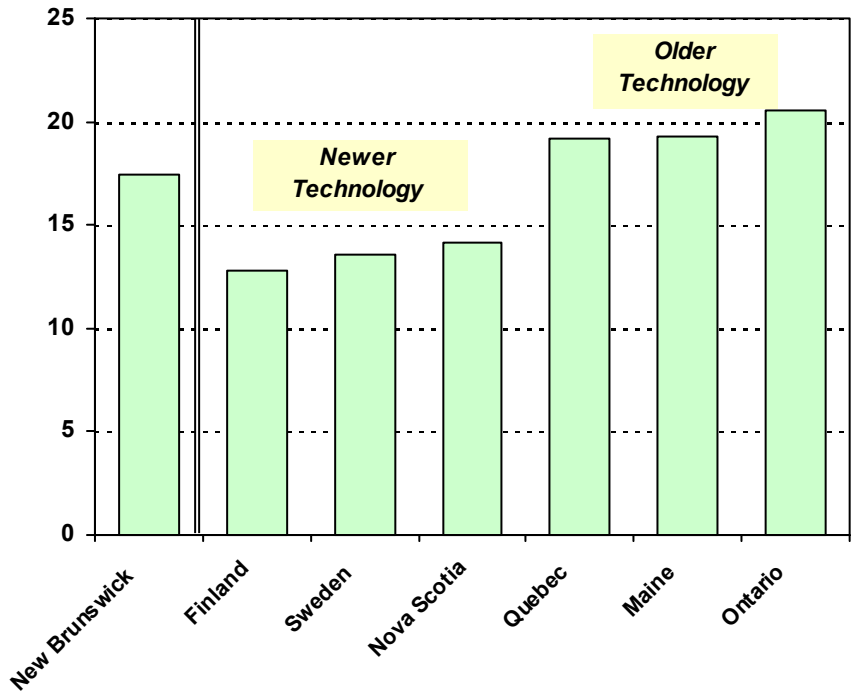
The consequences of not having a focused objective for timber supply are illustrated by comparing changes in New Brunswick's harvest relative to changes in Finnish harvests. Finnish harvests will continue to grow at around 1% per annum over the 40-year period from 1980-2020. In contrast, the opportunity between now and 2020 for New Brunswick's forests is zero. This is because the advantages gained from silvicultural investments in New Brunswick are partly used to compensate for environmental set-asides and constraints on harvesting.

In our opinion, a clearly stated timber supply objective for Crown Lands is essential for New Brunswick to retain a viable Forest Products industry in the province.

Industry Competitiveness Benchmarks

New Brunswick's forest industry sector contributes approximately 20% of the Province's GDP* – this critical part of the economy is at risk if competitiveness is eroded, due to a lack of investment.

- Capacity Weighted Average Technical Age -



Definition of Paper Machine Technical Age:

Provides an estimate of the asset quality by taking into account improvements through rebuilds. For this exercise, the capacity weighted average technical age is provided as a benchmark of paper machine technology gaps between regions.

In our opinion, segments of the forest industries in New Brunswick face a very uncertain future, due to constrained fiber supplies in the short- to mid-term (less than 40 years). This affects mainly softwood supplies from all sources economically available to industry, including imports from Nova Scotia, Quebec and Maine, as well as Crown and private resources in New Brunswick. Our regional fiber supply/demand perspectives indicate that New Brunswick will have to find ways to generate additional fiber within the province to offset reduced imports.

Why is this important? Global forest industries, especially the pulp & paper sector, are highly competitive with price cycles that can test the ability of high-cost producers to continue operating. There are several key factors that combine to define relative competitiveness, including wood cost, and the efficiency and scale of processing plants. If industry does not continually invest, the efficiency and scale of production assets will decline, and mill closure becomes much more likely. Our data indicates New Brunswick assets use marginally newer technology than most other North American competitors, but this technology is significantly below the asset quality of Finland and Sweden. Companies and financial institutions are very reluctant to invest in facilities if their due diligence indicates likely fiber shortages, as will be the case for the Province's softwood-based industry under the present forest management strategy.

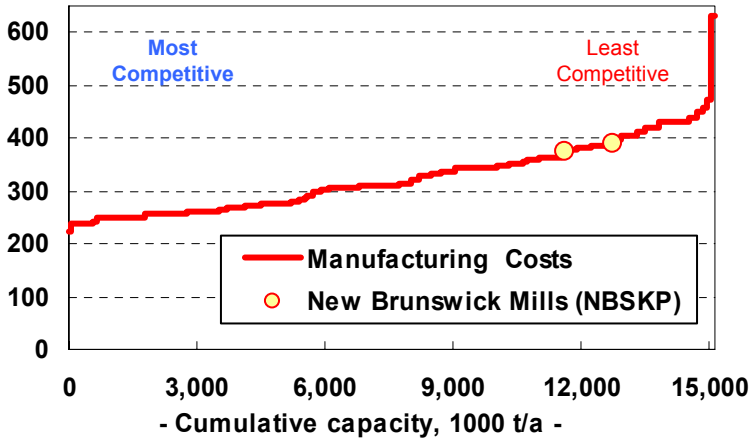
(*continued…*)

* Forest Industry GDP Share calculated as the value of forest industry production (primary processed products) at mill as a percentage of Provincial/National GDP

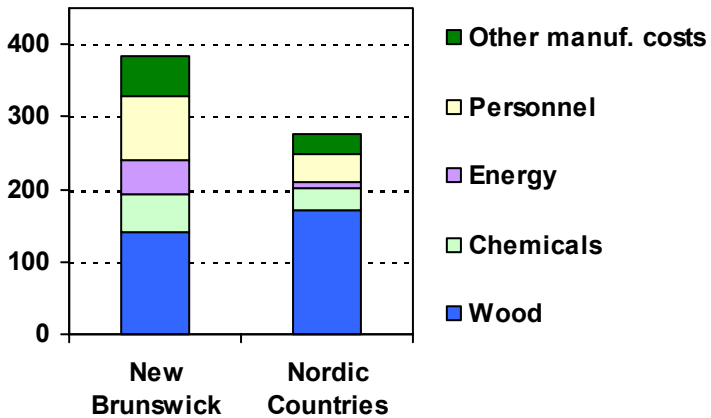
Industry Competitiveness Benchmarks (cont.)

The relative competitiveness of New Brunswick's softwood-based industry will continue to decline unless companies make significant investments.

- Global NBSKP Manufacturing Costs – USD/t -



- NBSKP Manufacturing Cost Elements – USD/t -



The impact of declining relative scale and technology is illustrated by the relative cost competitiveness of New Brunswick's bleached softwood pulp mills which are both among the less competitive producers of northern bleached softwood kraft pulp (NBSKP) supply. Technology gaps show up in process efficiency and scale related areas including personnel, energy and chemical costs.

The seriousness of this situation cannot be overstated. Without access to incremental fiber supplies, there will likely be a reduction in the forest industry in the Province. We also recognize the importance of maintaining and enhancing the natural environment in New Brunswick. Increasing emphasis on meeting these needs has affected immediate and long-term fiber supplies. Based on our experience, the conservation measures adopted on New Brunswick Crown Lands are at the high end of the range defined by the benchmarked regions. In setting the objectives embodied in the Vision document, DNRE has fulfilled the primary environment-related objectives, but at the expense of timber supply.

Consequently, we have explored options that will balance these two important outcomes for New Brunswick.

3.0 Scenarios

- Development and Assumptions
- Wood Production Outputs
- Annual Silviculture Cost Implications
- Silviculture Works Implications
- Annual Area Harvested
- Softwood from Specially Managed Areas
- Measures to Increase AAC Pre-2035
- Private Lands Conservation Values

Scenarios: Development and Assumptions

The scenarios have been developed to answer the question can long-term wood supply for industrial purposes be increased within the current objectives for Crown Land usage in New Brunswick?

Jaakko Pöyry Management Consulting developed the following scenarios where timber objectives were set and where the administrative decision regarding natural regeneration versus planting and level of silvicultural funding did not constrain forest management planning choices.

The scenarios presented were conceived by JPMC, based on the gaps identified in the Benchmarking Analysis and do not necessarily represent the views of DNRE or any licensee holders. The scenarios are a tool used to explore outcomes from selected courses of action, and are not intended to represent recommendations for future action. Scenarios were modeled by all licensees using the *Woodstock* forest management software. *Woodstock* is an internationally accepted forest management planning tool currently used by DNRE and licensees in New Brunswick.

In developing the scenarios, the focus was on increasing outputs of softwood. There are analogous opportunities for increasing outputs of hardwood. Consequently, the hardwood outputs do not reflect the full potential of the Crown Forests to produce hardwood timber. Scenario 2 does not differ markedly from the hardwood outcome under Scenario 1, which reflects implementation of current management plans.

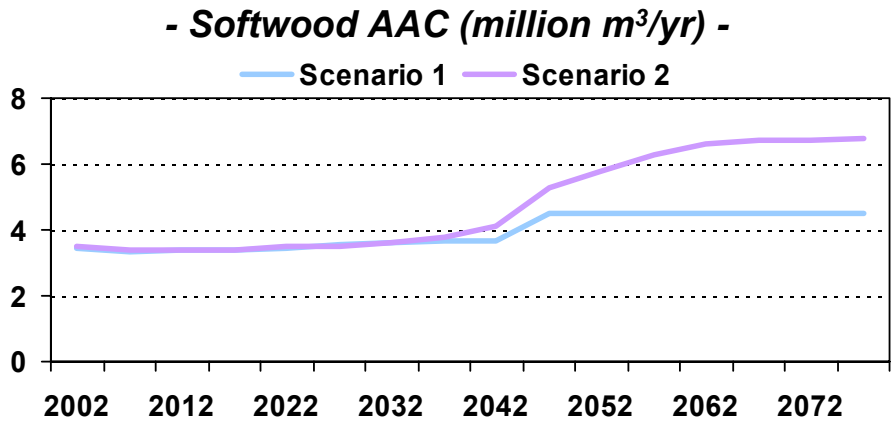
Finally, the data presented in all charts reflect a five-year average for a period starting at the date indicated.

The outputs from two potential scenarios are presented:

- **Scenario 1: "Vision Scenario"**
  - Current policies and management planning as outlined in the current vision document and licensees' management plans
- **Scenario 2: Maximize Long-Term Wood Supply While Meeting Current Vision Objectives**
  - Incorporates the following changes to Scenario 1
    - Modification of natural regeneration versus planting rules
    - Additional silviculture input as required to maximize timber supply
  - As with Scenario 1, the outcomes must also meet current habitat and vegetation community objectives

Scenarios: Wood Production Outputs

While it is possible to almost double the long-term softwood supply for industrial purposes within the current objectives for Crown Land usage in New Brunswick, supply will remain flat for 35 years.



The softwood timber supply from Crown Lands is increased under both scenarios. However, in both cases increases only occur approximately 35-40 years from now.

The relatively modest long-term increases under Scenario 1 show the impact of setting aside and restricting harvesting has partially offset the gains from the current and projected limited silviculture program on Crown Lands. The impact of set-asides and constrained harvesting affects the immediate and mid term periods and is reflected in the flat/declining curves for both scenarios before 2035.

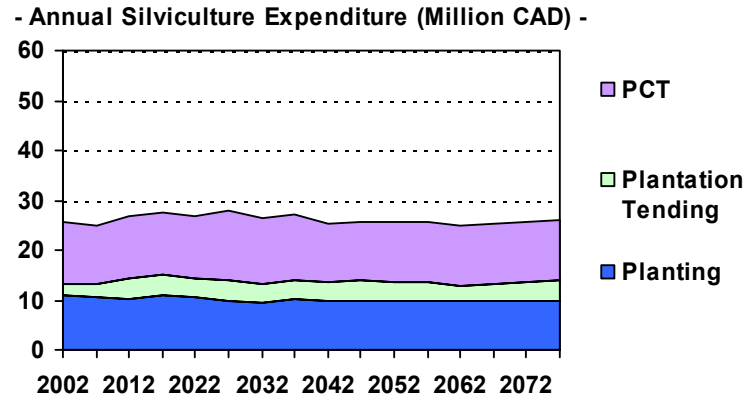
Scenario 2 is closer to the fiber-supply outcome industry needs to sustain competitiveness. However, even under this scenario, the additional volumes only become available after 35 years, with the likelihood of industry rationalization still present. Hence, while long-term supply can be raised, more careful attention to increasing the short- to mid-term supply is equally, if not more, critical.

For hardwoods, industry does not fully utilize available AACs and there is scope for industry to expand within the current AAC level. Consequently, the scenarios did not explicitly seek to maximize the production of these species. Under both scenarios,hardwood volumes (not shown on the chart) fluctuate around current AAC levels.

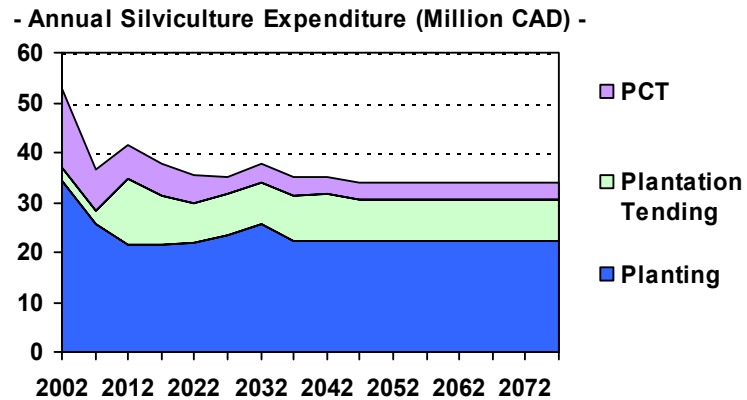
Scenarios: Annual Silviculture Cost* Implications

Under the more intense silvicultural management scenario (2), silvicultural costs double from the budgeted $23 million allocated in 2001 to just over $50 million/year, but taper to $34 million/year long-term.

Scenario 1



Scenario 2



* Annual silviculture costs were estimated based on the following:
Total planting cost = $889/ha
Total tending cost = $420/ha
Total PCT cost = $620/ha

Under Scenario 1, silviculture prescriptions and costs remain relatively static for the next 80 years. Approximately 50% of the budget is spent on pre-commercial thinning in hardwood and softwood stands, with the remaining 50% spent on planting pine and spruce.

Scenario 2 requires an initial doubling of silviculture costs, primarily due to a large increase in softwood planting. The spike in activity is aimed at bringing forward the volume of wood available from the managed forest in the mid-term (post 2035). The total program is forecast to decrease to a sustained level requiring an annual budget of approximately $34 million, or 30% higher than the Vision scenario (1) program.

Planted areas are tended 12 to 15 years after planting. Consequently, tending costs mirror the pattern of planting costs, but offset by just over 12-15 years.

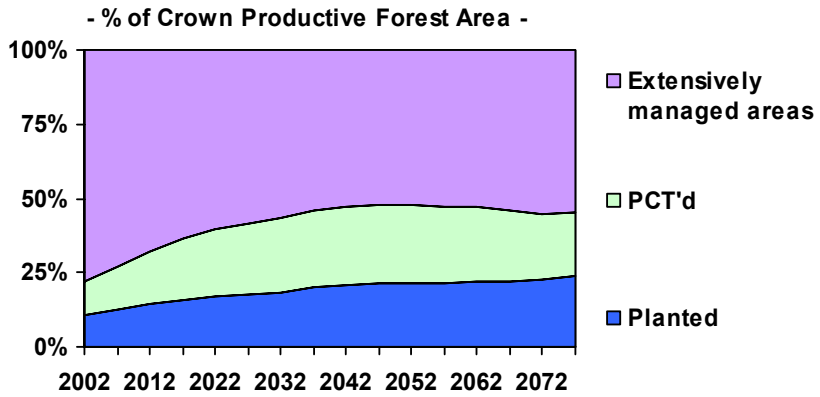
In contrast, the expenditures on pre-commercial thinning (PCT) go from $12 million under the Vision Scenario to $3 million for Scenario 2.

Funding for increased silvicultural activities can come from either the Provincial Government and/or industry. However, companies will not invest unless the additional fiber secured via a company's own investments on Crown lands are vested in that company.

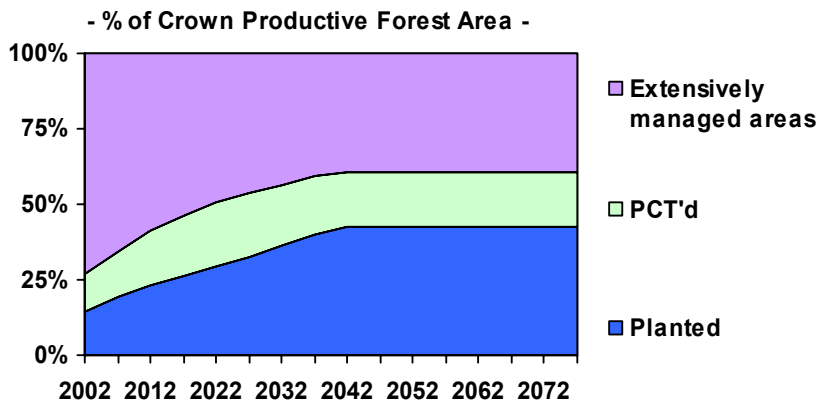
Scenarios: Silviculture Works Implications

The area of treated forest increases under the more intensive Scenario (2). In the long-term, 40% of the Crown Forest area would be planted and 18% would be pre-commercially thinned (PCT'd), versus 21% and 24% respectively for the Vision Scenario (1).

Scenario 1



Scenario 2



Funding silvicultural expenditures creates long-term wealth for the Province via future royalty payments, and the tax receipts from industry and individuals engaged in harvesting and processing the additional 3 to 3.5 million m3 annually.

However, there is a more immediate benefit for New Brunswick's economy. With an unemployment rate of 11.2 % of the adult workforce, the Province has a significant unemployment benefits payroll. Silvicultural works are a very efficient way for the Government to create jobs. With the exception of limited overhead, transport and seedling costs, the balance is translated directly into employment for workers in rural areas. Under Scenario 1, the level of silvicultural employment is expected to remain at approximately 11,000 man days/year. The man days required to achieve the increased silvicultural intensity under Scenario 2 will spike up to double the man days in the immediate term, settling back thereafter to a level approximately 50% above current levels.

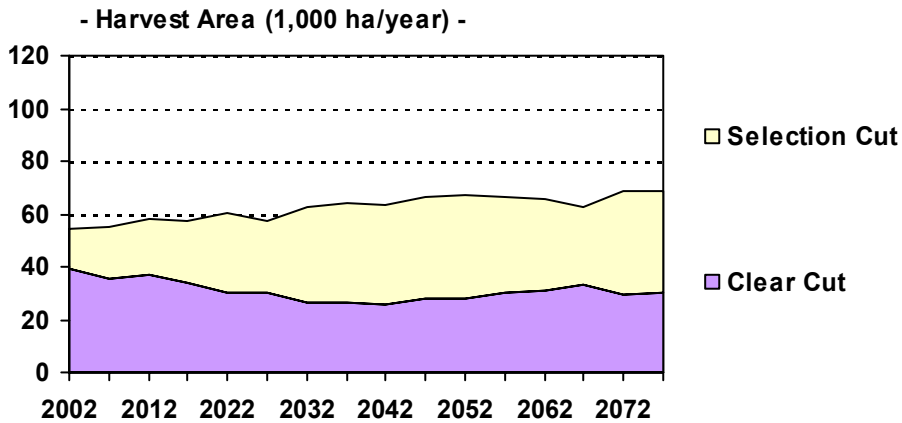
Under the Vision Scenario (1) the cumulative area treated remains just under 50% of the Crown Forest, with approximately even areas of planted, PCT'd and untreated production forest, with the balance in special management/ reserved areas.

The more intensive program retains the same level of special management areas/reserved areas; however, the production forest treatments change significantly in the mid-term. Approximately 42% of the area would be planted, 18% PCT'd.

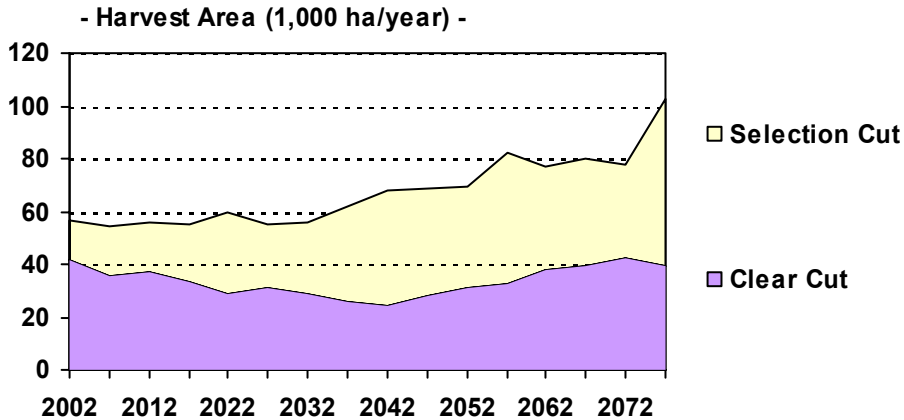
Scenarios: Annual Area Harvested

The area of clear-cut harvest is projected to remain at or near current levels under both scenarios. Increased harvest volumes will come from thinning or partial cutting operations.

Scenario 1



Scenario 2



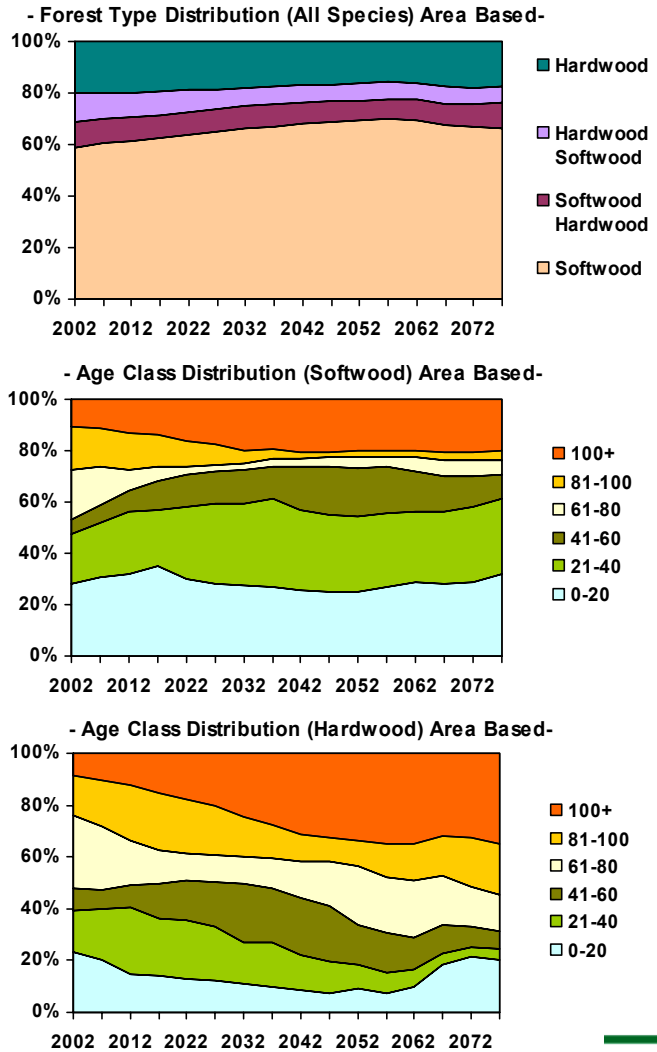
Clearcut area remains at or near current levels for both scenarios. Similarly, both scenarios project that the increased volumes will come from increasing selective harvesting/commercial thinning.

In both scenarios, the average softwood log ("piece size") is projected to decline over the next 80 years. The magnitude of this change may be an artifact of the modeling process. However, we anticipate a decline caused by the increased volume of timber that will come from thinnings of younger trees. The higher proportion of thinning material under Scenario 2 means the decline would be greater for this management option.

New Brunswick's forest industries have learned to cope with declining piece size as the forest transitions to a managed state. Measures already taken include installation of thin kerf sawmills and stud mills.

Scenarios: Forest Type Distribution

For both scenarios, the objectives outlined in the document "A Vision for New Brunswick Forests" prevent large scale changes in the forest type distribution and increase the proportion of old growth.



Both scenarios applied the same long term habitat type, vegetation community, and old spruce fir habitat objectives. The *Woodstock* forest management runs attempted to meet or exceed the long-term objectives which results in the following: prevention of large scale changes in the forest type distribution; and an increase the proportion of old growth. The results were very similar for both scenarios. For simplification purposes, the results are shown for only Scenario 2.

Forest type distribution is projected to slightly decline in the hardwood component of the forest over the long-term. However, the habitat type and vegetation community objectives prevent further decline in hardwood forests.

Age class distributions show the proportion of old (100+) softwood and hardwood is expected to increase in the long-term. This increase is primarily due to the creation of protected areas along with habitat types and vegetation community objectives aimed at preserving these forest conditions.

For the hardwood component of the forest, the increasing proportion of older hardwoods suggests that saw log size (and quality) should increase over time.

As the Crown forest transitions from an unmanaged to a managed forest, the proportion of 61-100 yr old softwood is expected to decrease. This is because most of the final harvesting of softwood will take place at ages 41 – 60.

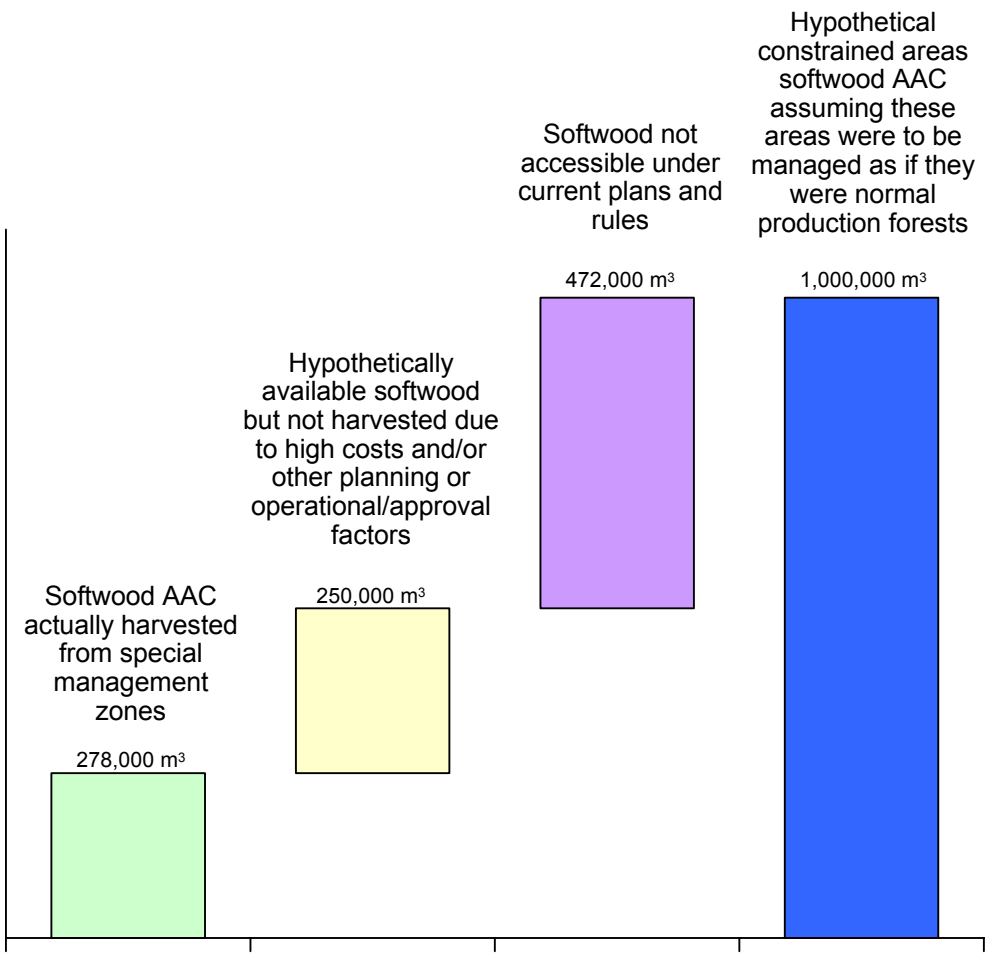
Scenarios: NB Ecoregions – Habitat, Veg & OSFH

DNRE has established habitat type, vegetation community and old spruce-fir habitat (OSFH) objectives for each Llicense as documented in “A Vision for New Brunswick Forests”. These habitat objectives were met in the vast majority of instances. However there were some cases where, even with no harvesting, Licensees could not immediately meet objectives due to current forest structure on the license. This was anticipated and the Vision statement outlines steps to be taken when these objectives cannot be met over the planning period.

As part of the scenario analyses, JPMC examined impacts on these habitat objectives for each of New Brunswick’s 7 ecoregions. The analyses showed that almost all of the non-timber or biodiversity-related objectives were achieved over the 80-year planning horizon. However, both scenarios still project certain ecoregions where some of the habitat type, vegetation community and OSFH objectives cannot be met for some period over the 80 year planning horizon. In these instances, Licensees are taking measures to actively create the desired stand conditions to more quickly achieve the objective levels stated in the Vision document.

Scenarios: AAC From Specially Managed Areas

The softwood AAC potentially available from harvesting in special management areas could increase by as much as 250,000 m3/year if these areas were harvested to the maximum level permitted under the DNRE's current regulations.



With no prospect for an increase in the softwood harvest for 35 years, the only areas where additional timber could be obtained during this period are the special management areas. These areas are available for partial harvesting, with the two related questions: Are licensees obtaining the full volume from these areas?; and Are there opportunities to obtain additional volumes from these areas by re-examining non-timber management needs and objectives?

There are 705,000 ha of special management forest. If managed as normal production forest, this area would yield an AAC of 1 million m^3/year. Applying existing constraints to timber production will reduce this total by 472,000 m^3. The 2002 management plans show that licensees plan to harvest half of this volume. The balance is not planned for harvest due to a combination of cost, local specific constraints and other operational and planning reasons.

There are opportunities to secure additional timber volume through consistent application of rules and standards. Harvesting in special management zones will maintain forest structure in the long term. A viable forest structure is needed to sustain non-timber objectives.

Scenarios: Measures to Increase AAC Pre 2035

The benchmarks on non-timber set asides and restrictions on harvesting, indicate opportunities may exist to reduce harvesting constraints in specific areas, which would increase the volume of timber in the critical 35 year period

There are potential opportunities for additional timber harvest if all special management areas are actively managed as discussed previously. We recognize that the combination of intensification of management on production forest and additional harvesting in the special management zones could lead to cumulative impacts on certain populations that require habitat elements not found in managed forests.

As learned in Finland and Sweden, more intensive management can have adverse consequences. There is a risk of reducing potentially important components of the forest, including hardwood species, uncommon softwood species (e.g., cedar and hemlock) and other elements of the diverse New Brunswick forests. Robust monitoring of biodiversity changes will be required to create the lead time needed to change direction if adverse impacts are detected.

New Brunswick's habitat needs must be recognized and planned for. Increasing the rate of planting will take time to implement and careful monitoring of past treated areas, and experimentation with modified harvesting systems, can develop solutions for meeting habitat needs, renewing these stands and also releasing AAC during this critical 35 year period.

In addition to the above initiatives, we believe the lack of a fixed timber supply objective has not imposed a discipline on the DNRE objective setting process. This appears to have led to imposition of "best case" set aside requirements, with the water buffers as an example. A different outcome might be achieved if the planning process was undertaken as an iterative process where the two sets of objectives were weighed and a balance struck. In our opinion there is an important opportunity for DNRE and the Licensees to develop a method to permit such a feedback loop.

Scenarios: Hardwood and Other Softwood

Along with the focus on New Brunswick's spruce/fir timber supply, the following issues should be incorporated into the Province's forest management strategy:

- In addition to spruce/fir, there should be a provincial strategy and specific objectives related to each of the following species groups:
  - tolerant hardwoods and intolerant hardwoods
  - cedar
  - white pine and red pine
  - hemlock
- DNRE policies and procedures should be consistent and aligned with the timber supply objectives for each species group.
- There should be support to undertake intensive silviculture and research to improve the quality and supply of hardwoods and other softwoods.

Scenarios: Private Lands Conservation Values

Conservation of non-timber values in New Brunswick's forests can also be advanced via more formal planning and integration of reservation areas within private forest lands.

Private industrial timberlands have set aside approximately 15% of the forest area in some form of buffer, protected area or otherwise special management zone. Another outcome of industry's increasing adoption of certification is that the management of these areas is becoming more formalized, with the plans being made publicly available.

We recommend that the conservation values of private lands should be taken into account when evaluating the need for set asides and special management on public lands. Industry experts and DNRE experts could collectively work on developing corridors, management for under-represented communities and other non-timber objectives on industry lands to maximize the value of these lands in meeting the overall shared goal of sustainably managed forests in new Brunswick irrespective of tenure.

We believe there should be a process to establish a form of voluntary conservation designations on private industry lands (and woodlots) that could provide a level of assurance of management intent that would allow DNRE to relax constraints on equivalent areas within the Crown Lands.

4.0 Conditions for Implementation

The most critical precondition for implementing the change scenario outlined is the need to obtain a mandate for the direction and magnitude of change.

As noted in the discussion on roles, responsibilities and control, New Brunswick does not have a strong public involvement in the Vision setting process. Most parties contacted during the Stakeholder Engagement process, and at the workshop, expressed their interest in participating in the Vision setting process. Consequently, we recommend that the public be encouraged to express their views concerning New Brunswick's Crown Forests.

Implementation of Scenario 1 requires no change as it represents the outcome from following the existing Vision document and License Plans. Scenario 2 requires addition of a more aggressive program of silviculture works across the Province. There will be preconditions and consequences arising. The preconditions include:

- Annual silviculture funding increase to over $50 million (approximately double the existing program) and rapidly tapering off to a sustained silviculture funding of $34 million.
- Modification of DNRE regulations constraining planting of harvested areas.
- There is no required change to the biodiversity objectives from the March 2000 Vision document".
- Re-weighting of Vision objectives to accord an equal timber production objective for all license areas that would include short- and longer-term objectives. For each license, the objective would be set and would apply to the licensee to ensure they were managing the license area to the full benefit of the New Brunswick community; and also to the DNRE to ensure timber production does not suffer as a consequence of decisions made to favor non-timber values.
- Re-examination of the extent of, and constraints applying within, special management zones. These areas contain the only potential additions to the softwood supply available during the next 35 years. There is time to test the implications of changing management. The Licensees and DNRE have jointly convened a project that includes among its objectives an examination of potential discrepancies among licensee management plans.

5.0 Responses to the Minister's Questions

The following summarizes the response to the Minister's four questions.

1. *Can long-term wood supply for industrial purposes be increased within the current objectives for Crown Land usage in New Brunswick?*
   - *If so, how?*

- It is possible to almost double the long term softwood supply for industrial purposes while meeting the current non-timber objectives for Crown land in New Brunswick.
- The doubling of softwood supply will require additional investments in planting, silvicultural costs increase from $23 million as budgeted for 2001 to just over $50 million/year, but tapering to an estimated $34 million/year long-term. In the long term, approximately 40% of the Crown Forest area would be planted and 18% would be pre-commercially thinned, versus 21% and 24% respectively under current management .

2. *Are the current objectives for habitat protection, wildlife, water protection and biodiversity appropriate?*
   - *Are the methods by which these objectives are being achieved appropriate?*

- New Brunswick has specific policy objectives and advanced management planning tools to allocate land uses spatially and over time to achieve quantifiable habitat and non-timber conservation objectives on Crown Lands. Over 32% of New Brunswick Crown Lands are in some form of protected area or special management zone. In some instances these objectives go beyond those employed in the other benchmarked areas.
- It is our opinion, based on our knowledge of conservation-related strategies used in other jurisdictions, that the approach used in New Brunswick is a sophisticated and complex solution to the problem of allocating land use across a managed and unmanaged landscape. The system combines state-of-the-art tools, and the latest science, bringing these together in a way that will generate spatial and temporal patterns of areas available for protected areas, special management areas, and subsequently harvesting to meet the long-term objectives for habitat protection, wildlife, water protection and biodiversity in the Vision document.

5.0 Responses to the Minister's Questions (cont.)

The following summarizes the response to the Minister's four questions.

3. *How do the objectives for New Brunswick's Crown Land compare with other jurisdictions?*
   - *Do other jurisdictions have specific objectives for wood supply for industrial purposes?*
   - *Are licensees in New Brunswick at an advantage or disadvantage with respect to wood supply?*

- Generally, the Crown forest policy objectives of New Brunswick address the same issues as those of other international jurisdictions, as well as within Canada. The similarities within Canada are natural, due to the national (forest policy) framework set by Canada Forest Accord, national forest strategy, the national approach to forest certification.
- A unique feature of New Brunswick Crown forest environmental policy objectives is that they are quantifiable, measurable, transparent, and outcome-based, while in many other jurisdictions forest policy objectives are expressed as statements of principle or broad objectives. Another clear policy difference relative to most other benchmarked regions is that in New Brunswick wood production is a secondary objective to be maximized after environmental objectives are met. In other jurisdictions, environmental and wood production objectives are either equally important, or wood production is the primary objective.
- Other competing jurisdictions have specific wood supply objectives. Ontario provides an example. Under the Living Legacy program, additional areas of production forest were set aside. The Government recognized the importance of the Crown timber supply and inserted an explicit timber production objective in the Ontario Forest Accord, such that the timber supply from Crown lands will not be reduced.
- A high level of dependence on Crown timber supplies and lack of a **primary** timber supply objective for Crown lands puts New Brunswick's forest industry sector at a disadvantage relative to competitors.
- In our opinion, a clearly stated timber supply objective for Crown Lands is essential for New Brunswick to retain a viable Forest Products industry in the province. Companies and financial institutions are very reluctant to invest in facilities if their due diligence indicates likely fiber shortages, as will be the case for the Province's softwood-based industry under the present forest management strategy.

5.0 Responses to the Minister's Questions (cont.)

The following summarizes the response to the Minister's four questions.

4. *Should DNRE change its current objectives, policies and procedures?*

- JPMC's expert, independent assessment of stewardship and management by benchmarking New Brunswick's forest policy and management with other relevant fiber-producing regions around the world has led to to following recommendations:
  - A timber supply objective should be set for each license area that would be binding on the Government and on the licensee. This would include a feedback loop to evaluate timber supply implications of DNRE management changes.
  - The public should participate in reviewing the objectives of management for New Brunswick's Crown lands to provide a mandate for the direction and magnitude of change in forest management.
  - The DNRE should reduce overlap in management and oversight of Crown lands. Ontario provides a model on how industry/government responsibilities have been streamlined.
  - Special management zones should be critically reviewed and where possible additional harvesting permitted. These areas should be managed using the best science to meet habitat and timber supply objectives.
  - Conservation values of private lands should be taken into account when evaluating the need for set asides and special management on public lands. This should include a process to establish a form of voluntary conservation designation on private industry lands (and woodlots).