Pathways and challenges to reinventing forestry in Newfoundland

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Overview

This paper outlines the forest policy and decision-making framework in Newfoundland, including the history of the forest industry, and changing tenure arrangements, legislation, social values, labour markets, and forest conditions. Notably, forest policy objectives have shifted from a narrow focus on wood fibre growth and extraction to policies embodying a more diverse suite of objectives, including ecosystem-based management and inclusive public participation. The central questions of this paper revolve around the responses of forest managers and decision-makers to this dynamic context: What is the current forest policy framework, and how (and why) has this changed over time? How does forest management and decision-making align with forest policy, and what are implications of gaps? Who is making decisions about forests and forestry in Newfoundland, who is benefiting from these decisions, and who is excluded?

The challenges facing forestry, particularly in the realms of ecosystem-based management and public participation, are examined in-depth, focusing on the tendency for foresters and forest policy makers at various levels of the Newfoundland and Labrador government to:

- prioritize timber above other values in forest planning, in part by sustaining expertise in a narrowly-defined view of forestry while undermining or ignoring other values;
- design management and silvicultural plans around the ideal of a regulated forest;
- view other (non-forestry) agencies as competitors rather than collaborators;
- maintain insufficient protected areas networks; and
- limit public participation through several means, including engaging in pre-ordained planning exercises, wherein the public has little substantive input into planning.

These policy challenges occur within the context of government-wide failure to implement meaningful land use planning or inter-governmental collaboration.

The paper then identifies promising steps already being taken to address the identified challenges, and suggestions for further policy opportunities available to both forestry and to other agencies involved in ecosystem-based management, including tools for interagency collaboration and more effective public participation.

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Contents

1. Introduction

A pessimist sees difficulty in every opportunity.
An optimist sees the opportunity in every difficulty. –Winston Churchill

Forestry has long been an important part of the economic and social fabric of Newfoundland.[1] From the 16th century through the 19th century, the forests of Newfoundland supplemented the fisheries, which formed the primary industry of the Island. Beginning in the 20th century, the forest sector rose to greater prominence, and at its peak in the 1930s, the pulp and paper industry comprised 53% of total goods exported from Newfoundland (Munro, 1978). Today, the industrial forest sector is in rapid decline: two of three pulp and paper mills have closed since 2005, and the remaining pulp and paper mill is operating at reduced capacity; many sawmills, logging contractors, and affiliated businesses have likewise closed. At the same time, conflicts and uncertainties have arisen surrounding land use and tenure, and shifting cultural and social values regarding the appropriate use of Newfoundland's forests. Forest policies in Newfoundland, as administered by the Department of Natural Resources Forestry [DNR-Forestry], have changed from a narrow focus on wood fibre growth and extraction to policies embodying a more diverse suite of goals described as "ecosystem-based management," which includes forest management, public participation, and research objectives (Nazir and Moores, 2001).

The policy and planning context in Newfoundland presents challenges for the forest sector and forest managers. There are apparent gaps between policy mandates and forestry planning, in part due to the difficulties of reconciling diverse land use objectives, a tendency to remain entrenched in the traditional management regime, a lack of capacity within DNR-Forestry and a lack of appropriate policy mechanisms, and procedural, rather than substantive or collaborative, public participation. In Section 1, I review relevant forest policy literature, focusing on forest policy dynamics and public input processes, followed by a description of methods. Section 2 provides a description of the context of forestry in Newfoundland, including the history of forestry on the island, and changing tenure arrangements, social values, labour markets, and forest conditions. The central questions of this paper revolve around the responses

[1] This paper focuses on the Island of Newfoundland and excludes Labrador, which is politically connected to Newfoundland, but differs economically, culturally, and in terms of forest policy and history.
[2] In using this term, I recognize it is controversial, and often described as "vague" or simply value-driven rather than scientific (see Lackey, 1999). It is nevertheless the closest descriptor for the forest policy objectives within the province, as outlined in the 2003 Sustainable Forest Management Strategy.
[3] Questions and themes were informed by a series of interviews (n=40) conducted by Sara Carson from February to

of forest managers and decision-makers to this dynamic context: What is the current forest policy framework, and how (and why) has this changed over time? How does forest management and decision-making align with forest policy, and what are implications of gaps? Who is making decisions about forests and forestry in Newfoundland, who is benefiting from these decisions, and who is excluded?

Section 3 includes an overview of forest policies, followed by an examination of the challenges facing forestry. Section 3 provides a critical assessment of current forest planning, particularly in the realms of ecosystem-based management and public participation, focusing on the tendency for foresters and forest policy makers at various levels of the Newfoundland and Labrador government to:

- prioritize timber above other values in forest planning, in part by sustaining expertise in a narrowly-defined view of forestry while undermining or ignoring other values;
- design management and silvicultural plans around the ideal of a regulated forest;
- view other (non-forestry) agencies as competitors rather than collaborators;
- maintain insufficient protected areas networks; and
- limit public participation through several means, including engaging in pre-ordained planning exercises, wherein the public has little substantive input into planning.

These shortcomings occur within the context of government-wide failure to implement meaningful land use planning or inter-governmental collaboration. This paper then attempts to bring attention to ways to narrow the gaps between policy and practice, which is the focus of Section 4. Section 4 highlights promising steps already being taken to address the identified challenges, and suggests further policy opportunities available to both forestry and to other agencies involved in ecosystem-based management.

Observers in Newfoundland have identified the need to connect forest research with real-world problems in the forest sector and forest-dependent communities (Moores, 2001). It is in this spirit that I submit this overview of forest policy and management with the aim to elevate and inform discussion.

This report utilizes interview data with forestry stakeholders, and a number of recent governmental documents, academic analyses, and environmental non-governmental organization [ENGO] reports to frame changes.

1.1 Literature Review

1.1.1 The metamorphosis of forest management and forest policy

Forests have been managed – or unmanaged – under a number of different regimes that have changed with social and economic needs. Forest policy analyst Michael Howlett (2001) has described the multiple stages of forest management regimes in Canada: from unregulated exploitation; to revenue enhancement, when governments started licensing producers and charging stumpage and rent; to conservation, which coincided with the rise of the pulp and paper industry and large-scale harvesting operations, when government began regulating wood removal; to the "current" management regime, which focuses on optimizing yields, converting old forests to young tree farms, and increased regulation. Howlett interprets Newfoundland forest policy stages as unregulated prior to 1875, shifting to regulation for revenue from 1875, conservation from 1955, and timber management beginning in 1970.

Following the timber management regime, there has been a marked policy shift away from single-focus wood fibre management to more wide-ranging management goals, accompanied by a more diverse set of participants. This new regime may be called ecosystem-based management or sustainable forestry (Nazir and Moores, 2001), and the transition to this new regime is central to this paper and policy analysis. I use the term ecosystem-based management [EBM][2], which can be defined as "management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem structure and function" (Christensen et al., 1996, page 669). It includes a number of components: intergenerational sustainability; measurable outcome-based goals; science-based decision-making that recognizes complexity and incorporates multiple spatial and temporal scales, ecosystem function and dynamics, and uncertainty and surprise; integration of human activities; and adaptability (Christensen et al., 1996). In terms of wildlife, for example, management under EBM moves from single-species concerns to focus on habitat, including habitat functions and processes (Galindo-Leal and Bunnell, 1995). The Society of American Foresters provides a forest-specific definition of EBM: "the strategy by which, in aggregate, the full array of forest values and functions is maintained at the landscape level" (Society of

[2] In using this term, I recognize it is controversial, and often described as "vague" or simply value-driven rather than scientific (see Lackey, 1999). It is nevertheless the closest descriptor for the forest policy objectives within the province, as outlined in the 2003 Sustainable Forest Management Strategy.

American Foresters, 1993). In forestry, EBM may be described as a paradigm shift (e.g. Thomas 1996), from sustained-yield forestry, focused on wood fibre production, to a type of forestry concerned with a broad range of goals and requiring new types of scientific expertise. This type of forest management is also described as "post-productive" to indicate the shift from productivist, fibre-oriented management to a management regime "concerned with the broader regulation of forest ecosystems and environments" (Milbourne et al., 2008, p. 617).

Paralleling these changes to forest management, policies toward forest communities have been re-examined and reframed. Historical notions of community stability based on predictable harvest and mill output have been replaced with visions of community *resilience* and health, wherein communities have some decision-making autonomy and more diversified employment bases (Donoghue and Sturtevant, 2007; Kelly and Bliss, 2009).

In this new conception of forest management, resilience and the ability to adapt to change have been prioritized over notions of optimization and stasis. However, while policy names and stated objectives have changed to reflect this new set of policy objectives, in many places legacies remain, such as the focus on wood fibre production within forest planning and the idea that community well-being is dependent on industry well-being (Price et al, 2009).

1.1.2 Sitting at the table: Forest policy and participation

EBM has emerged, in part, in parallel with societal shifts in (particularly first-world) environmental belief systems, from anthropocentrism and faith in the ability of mankind to efficiently control nature, toward a more "ecological worldview" (Dunlap, 2008). Individual perspectives about forest management can be arranged on a continuum, with utilitarian/anthropocentric at one endpoint and biocentric/ecocentric at the other. The utilitarian perspective emphasizes forest management for the purposes of maximizing economic value from wood products and may highlight fire and insect disturbances as threats to forest health (Abrams et al., 2005). The biocentric or ecosystem perspective emphasizes functioning ecological processes and such concepts as "resiliency" and "function" (Jenkins, 1997, p. 11) and may view human impacts, especially industrial forestry, as the primary threats to forest health (Abrams et al., 2005). While individuals may identify clearly with one value orientation or the other, the debate in communities and regions is more nuanced as people hold a range of views between pure utilitarianism and pure biocentrism (McFarlane et al., 2011).

Public participation processes have evolved from government-industry coalitions to include more broad public representation. From the 1960s, Canadian federal environmental policy followed a regulatory regime, implemented through binary industry and government negotiations. More recently, Canadian environmental policy has shifted toward a collaborative approach, retaining elements of bargaining but with new emphases on: 1) *precaution* and planning, rather than reaction to environmental problems; 2) voluntary, market-based initiatives; and 3) more inclusive, multi-stakeholder decision-making processes (Howlett, 2000). This change is in response to multiple public entities – including ENGOs, outfitters, and others – who have demanded more voice in land use and natural resource decision-making.

Literature on EBM often maintains a traditional view of *who* manages the forest, for example calling for scientists and managers to collaborate, but often discounting other stakeholders – loosely described here as "the public" – including human institutions and communities that are often dependent upon and engaged with the forest. For example, EBM is grounded in scales that are not human-defined but reflect natural processes, such as watersheds and ecoregions. But legal, political, and cultural boundaries, though ecologically arbitrary, will continue to impact how humans participate in natural resource management (Gerlach and Bengston, 1994). As EBM is implemented, the mechanisms of public participation need to be refined to understand and incorporate a complex and often contradictory set of expectations from the public. As part of the adaptive, learning-based processes of EBM, then, public participation processes can create outcomes which better reflect public values (Buchy and Hoverman, 2000) and which receive more broad-based public support (Shindler and Neburka, 1997). Public participation is also an end in itself, as it creates more democratic decision-making processes, facilitates collaborative problem solving, and builds capacity and social capital around relevant policy questions (Putnam, 1993)

Public participation takes a range of forms, from consultation and public surveys to collaborative governance, which involves "consensus-oriented decision-making processes" (Ansell and Gash, 2008, p. 548). Public participation can be arranged hierarchically, from nonparticipation to tokenism to management partnerships and citizen control (Arnstein, 1969). The type of public participation may vary according to the objectives for participation, such as mollifying an angry public, seeking public input, or creating empowered citizen groups and instituting collaborative forms of governance (King et al., 1998; Rowe and Frewer, 2004).

Different steps of a public process may include different types of public participation, with increasing levels of public involvement (Table 1).

Table 1. Public participation objectives, and corresponding participation methods, arranged from less public participation through more. Adapted from Beckley et al. (2007).

Public input objective	Participation tools/methods
Provide initial information	Position papers, educational displays, websites, newsletters, advertisements, newspaper articles, mail-outs
Gather information	Opinion surveys, open houses, feedback on websites, interviews
Define issues and goals	Visioning sessions, round tables, town hall meetings, consultant reports
Set evaluation criteria	Workshops, focus groups, steering committees
Develop options/solutions	Workshops, focus groups, open house with comments, panel debates
Evaluation/decision-making	Public advisory committees, citizen juries, task forces

Because public participation and social values are important to EBM, this paper asks how they are currently incorporated in Newfoundland, and how they could be incorporated more effectively. Therefore, the standards of "authentic" public participation, as described by King et al. (1998) and displayed in Table 2, are used to measure the extent to which the public has access to decisions on forest lands in the province. Two types of public participation are distinguished by King et al. (1998): authentic and unauthentic, with different kinds of participation, roles for government and citizens, and outputs (Table 2).

Table 2. Authentic and unauthentic participation (adapted from King et al., 1998).

	Authentic Participation	Unauthentic Participation
Interaction style	Collaborative	Conflictual
Participation is sought	Early, before anything is set	After the agenda is set and decisions are made
Role of administrator	Collaborative technician/governor	Expert technician/manager
Role of citizen	Equal partner	Unequal participant
Administrative process	Dynamic, visible, open	Static, invisible, closed
Citizen options	Proactive or reactive	Reactive
Citizen output	Design	Buy-in
Administrator output	Process	Decision
Decision is made	As a result of discourse, with equal opportunity for all to influence outcomes	By administrator, perhaps in consultation with citizens

The shifts in decision-making power displayed in Table 2 can produce conflicts because, as Buchy and Hoverman (2000) note: "people from the wider community often come to the participatory process expecting to gain greater control over the process while at the same time government agencies rarely want to relinquish control" (p. 19). As DNR-Forestry strives for more meaningful public input, public access to forest management decisions increases. Access is achieved through multiple means, including rights-based (legal) means, and through access to knowledge and information, technology, and institutional capacity (Kusel, 1996; Ribot and Peluso, 2003). The theory of access expands the narrow concept of property rights and tenure by acknowledging that access is more than a right to control natural resources, but the ability to do so. Part of this ability is through knowledge and information control. A traditional forestry view is that expertise is largely confined to the government; this technocratic view of participation means that the public has little ownership over planning processes or problem solving (LaChapelle and McCool, 2005). A lack of ownership leads to one-way flows of information and unhelpful public participation, whereas "when ownership is widely shared across a complex cultural and ecological landscape, the likelihood of broad social acceptability and political implementation increases" (LaChapelle and McCool, 2005, p. 282). Of course, this increased likelihood of acceptability should *not* be confused with consensus, which is unlikely.

A second component of natural resource access concerns the flow of benefits. In other words, who benefits from forest policy and management? Forest management was historically controlled by government officials and forest industry executives, and benefits accrued through harvests, while the needs of mills dictated forest decision-making. Tenure, which was based on sustained yield harvesting and locally-based wood processing, was linked to community stability and economic development (Vertinsky and Luckert, 2010). Social and economic benefits were measured in terms of revenue to industrial companies, jobs created in the industry, and taxable income for provincial governments. But across Canada, tenure arrangements have shifted with new management demands, such as EBM, as well as declines in forest industry. New expectations created new rules and regulations, as well as new opportunities for management, scientific discovery, and community development. The serious and rapid decline of the forest industry in Newfoundland in particular has created a need to re-examine access to and use of forests and forest products in the Province.

1.2 Methods

This research utilized qualitative methods, which are appropriate for gathering in-depth, exploratory information. This is an inductive research project, wherein research questions were not known *a priori* but were generated through the process of data collection, allowing researcher flexibility and the discovery of new information, rather than measuring pre-determined variables (Bliss and Martin, 1989). The project was exploratory because of the dearth of forest policy and land use policy research in the province.

Analysis was primarily based on interviews (n=42) conducted with employees of several government departments, environmental NGOs, outfitters and other forest users, and community leaders (see Appendix 1). Informal meetings were also conducted, often with academics and employees of government departments, to discuss the project, develop questions, and clarify concepts. All participants are anonymous and identified through assigned codes (Appendix 1 includes the full list of both interviewees and meeting participants whose words were coded and analyzed).

Initial meetings involved several DNR-Forestry employees and academics who recommended additional participants. A process of snowball sampling was then used to contact members of a diverse number of institutions. Interviews were semi-structured, and questions were developed over the course of the project. Initial questions, themes, and hypotheses were informed by a series of interviews (n=40) conducted by another researcher from February to April 2010.[3]

Document analysis was a second crucial component of the study, as most forest policies and planning efforts have been well documented. Documents pertaining to historical and current forest policy and management were obtained from DNR-Forestry archives, the Canadian Forest Service, libraries of Memorial University, and online.

Participant observation was also used as data. I participated extensively in forestry discussions, meetings, and conferences across the province, attended several forestry meetings and conferences about industry development, attended planning meetings for the Districts 9 and 16 five-year Operating Plan, and joined the Corner Brook Pulp and Paper [CBPP] Public

[3] Questions and themes were informed by a series of interviews (n=40) conducted by Sara Carson from February to April 2010. Those interviews helped to identify important issues relevant to forest policy; the most commonly-cited issues were land tenure and land use management, climate change, industrial economic innovation, public education, and wildlife management.

Advisory Committee and the CBPP science panel for Forest Stewardship Council certification. I attended field trips with industry (n=2), the Canadian Forestry Association (n=1), and multiple meetings with forest-related groups such as Model Forest Newfoundland and Labrador. I also conducted two focus group discussions: one about public participation with government, industry, and ENGO participants (n=6); and a phone discussion with representatives of ENGOs (n=5).

Therefore this work uses people's words – both text and discourse – as data, in keeping with qualitative conventions. I coded data using NVivo software for qualitative research, identifying relevant themes and their relationships, and developing and testing hypotheses related to emerging research questions. Hypotheses were adjusted over the course of data collection and tested in subsequent interviews and through document analysis.

2. The Context of Forestry in Newfoundland

Forest policies in Newfoundland have been formed by cultural, political, economic, and ecological forces over time. I begin with an overview of the history and context of forestry in Newfoundland, emphasizing the roles of several human institutions: government agencies, industry, and communities. Forest policies have changed largely because of these contextual factors, both external (e.g. global markets) and internal (e.g. changing social values). This is followed by a discussion of social values regarding forestry, and labour and livelihoods connected to the forest sector.

2.1 History of the Forest Sector in Newfoundland

Humans in Newfoundland have depended on the forests for millennia. Prior to European settlement, multiple Palaeoeskimo and Indian groups utilized the caribou and other land animals, roots, and berries in the forests to supplement their marine-based diet (Higgins, 2009; Renouf, 1999). For this paper, the history of Newfoundland's forest sector begins with Euro-Canadian settlement.

2.1.1 Sawmills: the first industrial wave

From the 17th through the early 19th centuries, Europeans established small, usually seasonal coastal settlements that utilized wood for shipbuilding; the first sawmill was built in Newfoundland in 1610 (Trelawny, 1990). Both Britain and France had fisheries on the Island, but little interest in inland resources as economic activity centered on the fishery and permanent settlement was prohibited until 1824. Up to 1890, sawmills primarily provided lumber for domestic use, especially home construction.

The Act of 1844 established timber rights, but limited them to 100-acre lots intended for settlement and small-scale development. Timber holdings sizes were then increased dramatically with an Amendment to the 1872 Act extending the maximum lease area to 36 square miles (Munro, 1978). Forest protection became a clear government priority in 1884, when timber leases were tied to sawmill capacity, with 1000 board feet (MBF) capacity required for every 2.5 square miles of land, and requirements for lessees to "prevent all unnecessary destruction of growing timber… and to exercise strict and constant supervision to prevent the origin and spread of fires" (Munro, 1978, p. 225).

In 1890, the railroad was completed from St. John's to Port aux Basques, and the first commercial white pine (*Pinus strobus*) mill was established in Botwood. Additional sawmills were established in Newfoundland to meet both domestic and increasing export demand – there were 195 on the island by 1900 (Munro, 1978).

The sawmilling boom lasted only about twenty years and by 1911, the industry was in decline. Part of the reason was inadequate supplies of white pine, which had high proportions of defect (Munro, 1978). Overproduction, as well, contributed to the decline of the sawmill industry, as the rate of production increased from 11.4 million board feet per year in 1884, to 45.2 million board feet per year by 1900 (May, 1998; Munro, 1978; Ommer, 2007). An introduced pathogen, the white pine blister rust, has further depleted the island of white pine.

Yet even as sawmill production declined, the number of mills actually increased, from 347 mills in 1911, to 690 mills in 1921, and 1,600 mills in 1947 (Trelawny, 1990). Though very numerous, these were small mills, processing black spruce and balsam fir for local use. Following confederation in 1949, domestic sawmill activity declined and imported lumber accounted for an increasing proportion of local consumption. This decline in domestic production and competitiveness was common across all sectors as tariff protections with Canada disappeared (Letto, 1998).

2.1.2 The rise of pulp and paper

In the early 20th century, the sawmill sector gave way to the burgeoning pulp and paper industry. The shift toward a pulp and paper forest sector was facilitated by government subsidies in the form of long-term tenure agreements and inexpensive wood supply, guaranteed loans and grants, road building, and free hydropower, coupled with private investment.

Pulp and paper leases, valid for 99 years, were first created in 1890, when 6- to 150-square mile leases were extended to pulp and paper manufacturers for $20 per square mile plus $20/square mile at years 25, 50, and 75, with no royalty charges on the trees[4]. Pulp and paper manufacturers were therefore favoured over sawmill operators, who had to pay rent, land bonuses, and royalty. Subsequent legislation maintained this favourable payment scheme for pulp and paper (Munro, 1978). Support for the pulp and paper industry was in keeping with Newfoundland policies that emphasized export-based industrial development, often financed through foreign loans and under foreign management (Cadigan, 2009; Letto, 1998; Summers, 1994). Over time infrastructure requirements for leases were relaxed, fees were reduced, and lease periods were extended (Munro, 1978).

Because of the importance of the fisheries, common property rights to the coastal forest or "fishermen's reserve" had developed, and the coastal forest resource was largely utilized for domestic use and to support the fishery, while industrial development targeted inland forest resources. Thus, forest tenure in Newfoundland evolved along two different paths, the 3-mile commons along the coast and the pulp and paper industry-leased insular forests. The first conflicts over forest access occurred between the industry and Newfoundland residents who used the timber for domestic use as industrial operations began to encroach upon coastal resources in the early 20th century (Cadigan 2006). Pulp projects around the communities of White Bay South and up the northern peninsula in Roddickton intruded upon the 3-mile limit, blurring distinctions between the commons and the industrializing interior forests, and "weaken[ing] the integrity of the three-mile limit" (Ommer, 2007, p. 101).

Despite some pushback for these tenure conflicts and, beginning in the late 20th century, for environmental conflicts, the Province largely continued to support the pulp and paper industry. In fact, the relationship between industrial owners in the pulp and paper industry and the government of Newfoundland was essentially collaborative, in a joint bid to develop the

[4] Newfoundland, 1890. An Act to amend the Crown Lands Act, 1884, and the Acts in Amendment thereof. 53 Victoria, Cap. 1. (see Munro, 1978)

forest resources of the Province, diversify employment, and bring jobs to remote regions of the province.

2.1.3 Tenure under the pulp and paper era

Until 2009, forest land tenures in Newfoundland were categorized as: 1) freehold land, obtained through grants exchanged for railway construction from 1896-1912; 2) licensed or leased land,[5] granted under the various Crown Lands Acts, usually as 99-year leases; and 3) unalienated Crown Lands. Freehold grants provided the most complete land tenure under British law and custom; leased lands imparted conditional property rights for a specified time while ownership remained with the Crown. Almost all of the non-Crown tenures were eventually consolidated and controlled by two pulp and paper companies, the Anglo-Newfoundland Development Company in Grand Falls, established in 1909, and Newfoundland Power and Paper Company in Corner Brook, established 1925 (Munro, 1978). In 1962, the Grand Falls mill, then Price Pulp and Paper, had 7,577 square miles total under its domain; the Corner Brook mill, then Bowater, had 14,618 square miles (Munro, 1978). The majority of these lands were technically property of the Crown, but the pulp and paper companies created management, harvest, and road plans, and granted cabin permits, effectively "regulating internal use patterns" of the landscape in the words of Schlager and Ostrom (1992), and determining the end uses and beneficiaries of forest utilization. While CBPP was bound by provincially-established forest practice guidelines and reporting regulations, as well as voluntary certification requirements, long-term leases in Newfoundland were essentially equivalent to private landholdings because of their duration and relative autonomy regarding forest practices (APEC, 2008).

The pulp and paper industry went through multiple ownership changes, as the Grand Falls mill [hereafter referred to as the Abitibi mill] was purchased by Price Pulp and Paper in 1961, which became Abitibi-Price in 1979, Abitibi-Consolidated in 1997, and finally AbitibiBowater, based in Montreal, in 2007.[6] The Grand Falls mill closed in 2009. The Corner

[5] Licensed and leased lands have subtle distinctions, but I am using the term lease because it implies ownership rights. Many historical documents refer to timber "licenses," and some participants in the study indicated that the correct term is neither license nor lease but timber "rights." Both terms are misleading as the tenure system in clearly gives management and decision-making authority, two important bundles of property rights, to pulp and paper lessees (per Schlager and Ostrom, 1992). Lessees also could sub-license rights to other parties, and as exemplified by payments given to CBPP in 2009 and 2010 (Auditor General, 2011), they could "sell" rights back to the Crown. Another alternate term, timber "tenure" is not sufficiently descriptive.

[6] All iterations of Abitibi are referred to as Abitibi. The mill in Corner Brook is CBPP.

Brook mill [CBPPL hereafter], built by the Anglo Newfoundland Development Company in 1925, was acquired by International Power and Paper Company, based in New York, in 1928, purchased by the Bowater Company of England in 1938, and finally by Kruger, based in Montreal, in 1984. A third mill, based in Stephenville, was established by Labrador Linerboard Limited in 1972, purchased by Abitibi then closed in 2005. As of 2011, only CBPP has continued operations, though in 2008 it shut down two of its four paper machines.

Both large and small sawmills relied on short-term exchange agreements with CBPP and access to unalienated Crown Lands for timber. Because much of the wood in the province was small diameter, sawmills sold small-diameter trees, excess residue and chips to pulp and paper mills, and pulp and paper mills sold sawlogs to sawmills. This created an interdependent industry, though with favourable tenure arrangements for pulp and paper operators. The sawmilling industry persisted, though as pulp and paper mills closed, so have sawmills. There were still many small-scale sawmills as of 2011, perhaps over 2000,[7] though just 8 sawmills produced 80-90% of the annual board feet (Greene, 2011).

2.1.4 The tenure picture in 2011: relinquishments and expropriations

As of 2011, the Island of Newfoundland had a total of 11.1 million ha, half forested and half non-forested. Of the 5.6 million forested ha, 63% were considered productive forest[8] and the remainder were non-productive forest. The productive forest was further divided into Class I (57%, about 1.51 million ha) and Class III (43%, about 2 million ha) lands. Class I lands were considered available for harvest and form the basis of wood supply analyses; Class III lands were not included in wood supply analyses and include lands with no harvest because of regulations, such as no-cut buffers and protected areas, and lands with economic and operational constraints because of isolation or difficult harvesting conditions. Of the Class I lands, 43.2% (860,000 ha) had no significant constraints and the remaining 56.8% had some constraints because they fell within public water supplies or near outfitting camps, or had been identified as contributing wildlife or other values (Table 3). It should be noted that, despite constraints, all Class I lands were harvestable.

[7] Meeting, DNR employee, May 2011
[8] Productive forests are defined by potential volume per hectare: 35 m^3/ha at rotation age.

Table 3. Land, forest land, productive forest land, and Class I productive forest land on the Island of Newfoundland. From DNR-Forestry (2011b). *All values in hectares*.

Total area	**11.1 million**						
Non-forest	5.5 million						
Forest	5.6 million	**Forest**					
		Non-productive	2.1 million				
		Productive	3.5 million	**Productive**			
				Class III	1.5 million		
				Class I	2 million	**Class I**	
						No sig. constraints	860,000
						Some constraints	1.1 million

Combining CBPP and unalienated Crown lands, about 25% of productive land was available for harvest *without* constraints – which is 15% of the total forested land, and 7.8% of the total island. Another 31.4% of productive forest land was available for harvest *with* some constraints – about 20% of the total forested land, and 10% of the island. In total, 2 million ha out of 11.1 million ha (17.8%) on the island were considered available for commercial harvest.

As of 2011, CBPP had 1.5 million ha of leased lands, with lease rights extending to 2037 (Figure 1). About 640,000 ha of CBPP land was available for forest harvesting (Brown and Wells, 2011).

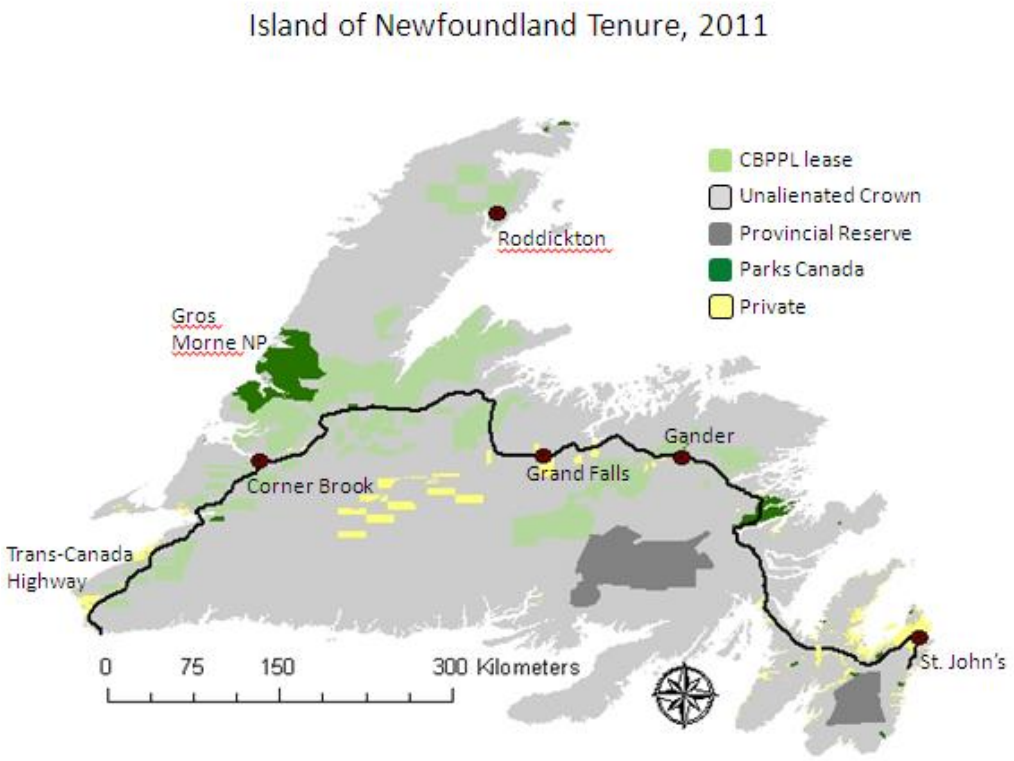

Figure 1. Map of the Island of Newfoundland with its tenure system. Data from DNR-Forestry.

In Figure 2, it is evident that the proportion of unalienated Crown lands on the island increased from 2001 to 2010 (Figure 2). This enormous shift in tenure was the result of the expropriation of Abitibi lands and the relinquishment of some CBPP lands. The Abitibi lands were expropriated when its Grand Falls mill closed in 2009, while CBPP relinquished sizeable chunks of its leased lands for several reasons: to increase available cash; because of decreased mill capacity, thereby decreasing the need for wood; and, in one instance, in response to environmental pressure and conflict.[9] CBPP relinquished their rights to 447,427 ha of leased lands in 2010 for $12 million (Auditor General, 2011).

[9] Conflicts surrounding old growth logging in the Main River watershed resulted in relinquishment of tenure to the province. Other environmental conflicts have resulted in designated viewshed areas with no harvesting, such corridors along the Humber Valley near Gros Morne National Park, but no land relinquishment.

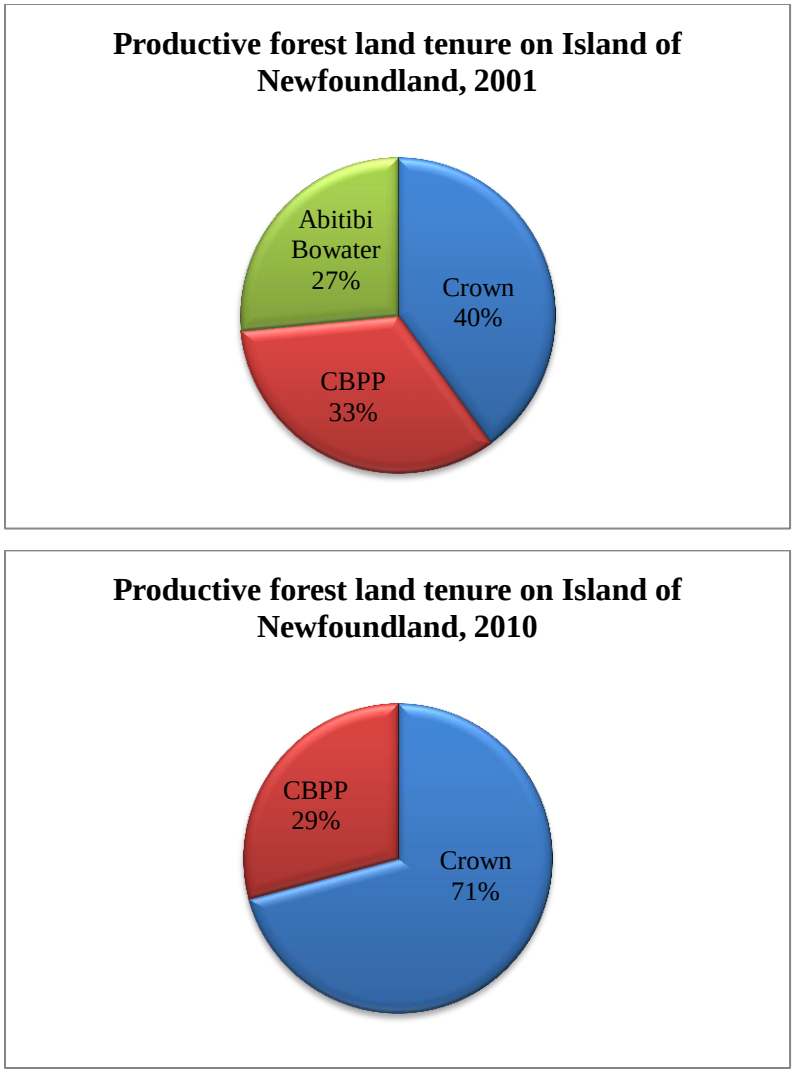

Figure 2. The changing tenure picture in Newfoundland (island portion only): productive forest tenures in 2001 and 2010. From DNR Forestry 2011b.

Other tenures are impacted by forestry (and vice versa), including protected areas and municipalities that share boundaries with managed forests. Protected areas have various levels of protection and management for biodiversity conservation, scientific research, recreation, education, or ecotourism (DEC, 2010). Protected areas may be forested or non-forested, provincially-administered or federally-administered. Approximately 7.7% of the land base of the Island of Newfoundland, or 859,931 ha, is legislatively protected. Provincial protected areas account for 5.7% of the land base (636,037 ha); federal protected areas make up 2% of the land base (223,894 ha).

Many municipalities also depend on forests for employment, as well as subsistence and recreational forest uses such as domestic fuelwood harvests, hunting, mushroom and berry

gathering, tourism, snowmobiling, and hiking. Members of the public can access all Crown lands, including leased pulp and paper lands, for subsistence and recreational purposes.[10] Municipalities are also impacted by forest management in their watersheds, and through aesthetic, spiritual, and cultural concerns.

2.2 Social values

Across Canada, and in Newfoundland and Labrador, forests have become a focus of environmental concern and attention. Newfoundlanders' attachment to the forests and concern for their well-being is evident in surveys administered by Bath (2010; 2006). In the two surveys, researchers randomly selected residents of western and central Newfoundland for quantitative monitoring of attitudes and knowledge regarding forestry in the province. In both the 2006 and 2010 surveys, residents listed their top five forestry priorities as wildlife, scenic beauty, protection of watersheds, wilderness preservation, and plants. These non-consumptive values were ranked much higher than commercial or domestic use, with implications for how the public views its forest resources and the role of forest management (Bath, 2010; Bath, 2006).

Incorporating these social values is a fundamental component of EBM. As mentioned previously, as the public has gained access to planning processes, new priorities and expectations have been imposed on forestry, particularly non-timber values such as wildlife habitat, aesthetic considerations, and conservation of old forests. These new values are evident in forest policies themselves, and also in a series of documents produced by Model Forest Newfoundland and Labrador [MFNL].[11] One report identified a commitment to a "new perspective" for forest management, with: "goals of protecting biodiversity and providing social benefits including employment, recreation, and a healthy environment" (MFNL, 1997, p. 2). The MFNL conducted a survey of people active with working groups affiliated with the MFNL. The survey (n=70), though not representative of the public at large, likely reflects concerns of people who are actively involved in forest management decisions in the province (MFNL, 1997). Pulpwood supply was deemed very or extremely important by 60% of respondents, but ensuring that

[10] As with commercial activities, domestic harvests (for pulpwood and sawlogs) and recreational activities (especially cabin building and hunting) have become more regulated over time. Today, Newfoundlanders can still access company lands for a variety of purposes, but permits are required to build a cabin, harvest wood, or hunt, fish, or snare.

[11] Formerly the Western Newfoundland Model Forest

logging would not threaten rare or endangered species was deemed very or extremely important by 86% of respondents. A summary of selected results is provided in Figure 3.

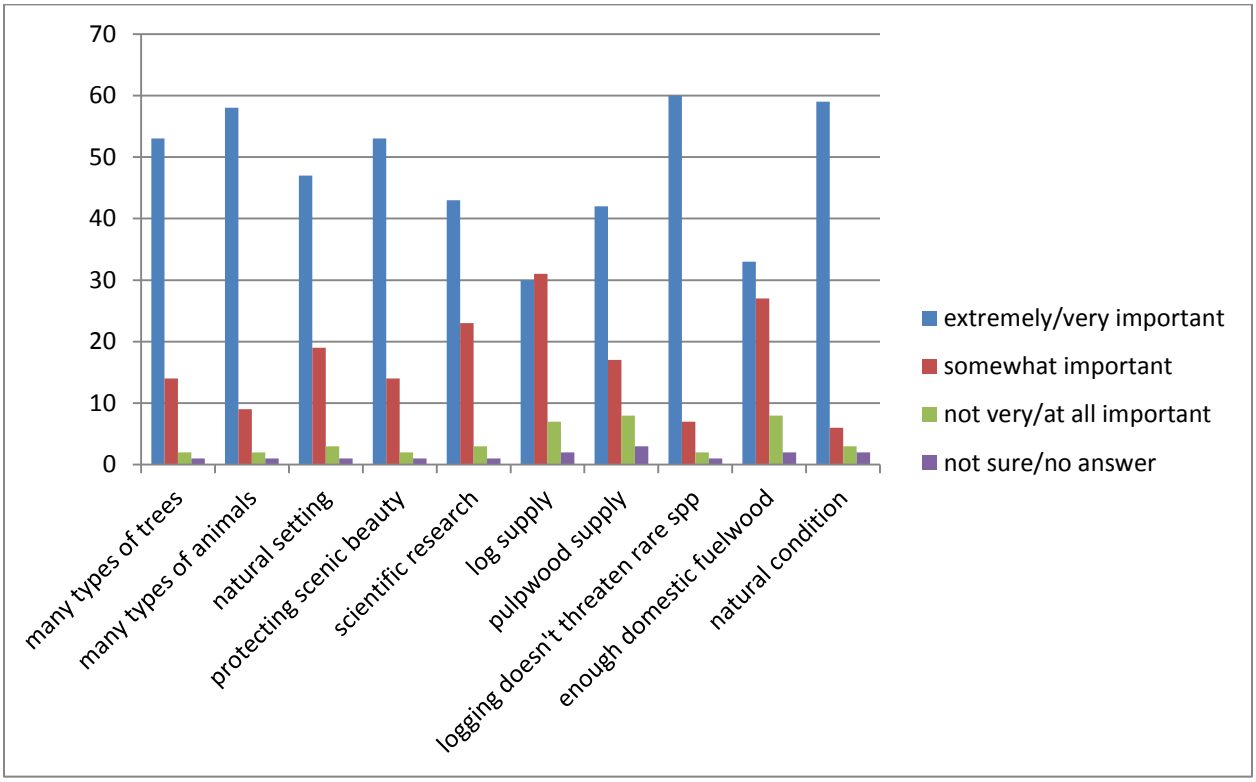

Figure 3. Responses (n=70) to the question *how important is each of the following*? From a MFNL survey of working group participants.

While management for conservation and non-timber values was therefore considered very important by participants, forest industry was also considered important. Similar questions administered by Bath (2006; 2010) confirmed this finding. This indicates that participants expected forest management to reconcile multiple, sometimes conflicting forest values.

2.3 Labour and livelihoods

The pulp and paper industry grew in terms of volume produced through most of the 20th century, though employment dropped with mechanization in both sawmills and in logging operations. For example, in 1954, 154 m^3 of wood was required for one pulp and paper industry job; in 1989, 651 m^3 of wood was required for every pulp and paper job (Pollard, 2004). Labour patterns also changed dramatically over time, from industry-run camps near the wood supply, to contractors with mechanical harvesters in the 1980s, usually based in established communities (Pollard, 2004). The number of loggers in the province declined from 10,333 in 1951 to 3,085 in

1971; and when Bowater sold to Kruger, CBPPL ended direct employment of loggers altogether (Ommer, 2007). Because of the technological transition to capital-intensive mechanical harvesters, contractors have continued to consolidate and out-compete small-scale logging operations that cannot afford mechanical harvesters (Ommer, 2007). In 2001, three pulp and paper mills in Newfoundland employed 1200 people within the mills and there were 1600 loggers associated with the industry; approximately 1200 sawmills employed 700 mill workers and loggers (Parsons and Bowers, 2003). Then from 2004 to 2007, Newfoundland and Labrador had a 35% decline in forestry employment, the highest of any province in Atlantic Canada (APEC, 2008). The majority of jobs lost were from logging (800 jobs lost) and the pulp and paper industry (600 jobs) (Wernerheim and Long, 2011). In 2007, CBPPL shut down one of its paper machines, resulting in 100 jobs lost; in 2009, Abitibi closed its Grand Falls mill, with a loss of 410 mill jobs and 345 logging jobs (Wernerheim and Long, 2011). In 2009, forestry and logging represented just 0.2% of the employment in the province (Department of Finance, 2010a). Some areas of the province, including the Great Northern Peninsula, saw the pulp and paper industry essentially vacate the region, leaving a few remnant sawmills and logging contractors. Employment in pulp and paper continued to contract, with at least 46 job losses at CBPPL in 2012 (Canadian Press, 2012). Forestry employment has been characterized by contraction and instability, and few Newfoundlanders today are connected to forest industry or even know someone within forest industry.

But what has persisted is the importance of forests in Newfoundland in providing other livelihood benefits. As Omohundro (1994) explained, subsistence activities such as hunting and domestic fuelwood and sawlog harvesting have persisted "as a recreation, a regional mark of distinction, a bank of useful skills, an expression of self-esteem, a way to stretch limited cash, and an insurance against sudden drops in a household's income" (page xviii). The net effect of these activities provides substantial supplemental economic and social benefits for many residents, especially in rural areas (den Otter and Beckley, 2002).

2.4 Forests in NL: changing structure

The forests of Newfoundland and Labrador lie at the edge of the boreal forest region of North America. In western Newfoundland, most forests are dominated by balsam fir (*Abies Balsamea* (L.) Mill.), while in central Newfoundland, more frequent forest fires have contributed

to black spruce (*Picea mariana)* dominated forests; together, these species comprise over 80% of the forest (Brown and Wells, 2011).

Forest management, which includes logging, has resulted in a significantly younger age structure than the pre-European forest structure (Ommer, 2007) with larger patch sizes and reduced flora and fauna biodiversity (Thompson et al., 2003). Industrial forest management has narrowed the age class distribution of boreal forests and changed forest composition, dynamics, and ecosystem processes (Cyr et al., 2009; McCarthy, 2000). Some old, unmanaged forests of Newfoundland had a more heterogeneous gap structure, more large down wood, larger diameter trees, and larger snags relative to second-growth forests (Thompson et al., 2003). Forests of western Newfoundland, which were characterized by insect disturbance, probably displayed a range of structures, often with stand-replacing disturbances that resulted in relatively even-aged stands (McCarthy and Weetman, 2007), but many other stands had multi-cohort structures (Jardon and Doyon, 2003).

Structural changes in the forest have occurred over time; forest operations initially focused on mature, high-volume stands then gradually moved toward lower-volume stands as high-volume stands were depleted within an area (Pollard, 2004). In the 1940s and 50s, the area logged in Newfoundland increased, and the volume of wood harvested increased with the introduction of the chainsaw. In the 70s, 80s, and 90s, the harvested area remained steady but the volume of wood processed increased as a consequence of more extensive road networks and the opening of new stands (Pollard, 2004). In the 1990s, the feller buncher and forwarder further increased productivity (Pollard, 2004). Even-aged harvesting, also known as clearcutting, may be the only economically viable form of harvesting and regeneration in Newfoundland, though other methods such as selective harvesting have been attempted.[12]

Until the closure of the Abitibi mills in 2005 and 2009, many forestry experts pointed to a wood supply deficit. In 2003-2004, when there were still three pulp and paper mills, pulp and paper mills utilized over 2.25 million m^3 of softwood annually, 1.4 million m^3 from island sources and over 800,000 m^3 from other sources such as off-island sources, recycled paper, and sawmill residue; sawmills utilized 447,000 m^3 of softwood; and fuelwood users cut 336,000 m^3 of softwood (Parsons and Bowers, 2003). As mills have closed, the amount of wood harvested has declined and the wood deficit has turned into wood availability, with harvests at around 1

[12] Meeting and field trip with industry foresters, 2011.

million m^3 annually, though far more wood is available for harvest. This availability is geographically uneven, as black spruce has become the favoured species for both pulp and paper and sawmill operators. Black spruce, typically found in central Newfoundland, has pushed remaining industrial logging operations to focus on that region. Locally-sourced balsam fir is still extensively utilized by CBPP, and black spruce is regularly transported hundreds of kilometres from central Newfoundland to Corner Brook, on the west coast. This species mix could change, of course, as new forest products opportunities arise.

3. Forest policies in Newfoundland

3.1 Forest policy overview

The Forestry Act in 1990 began the evolution of forest policies in Newfoundland from a specific focus on fibre management to EBM (Nazir and Moores, 2001). The 2003 Provincial Sustainable Forest Management Strategy provided clarity regarding this shift, which it labeled a "new vision" for forestry in the province, that of : "finding a balance between the ecological, economic and social values that the public defines" (DNR 2003, p. 1). This balance was to be achieved through sustainable forest management, which acknowledges ecosystem complexity and uncertainty, and the importance of adaptive management.[13]

The central policies and planning documents in Newfoundland are required by the Forestry Act (RSNL 1990 c F-23), which mandates forest planning and public participation (Table 3). Planning processes are temporally and spatially nested, with 20-year forest strategies providing the broadest level of vision and guidance, 5-year operating plans providing more specific forest management directives, and annual operating plans providing spatially and temporally explicit harvesting and silvicultural plans. The bulk of planning occurs with 5-year plans, which designate harvests and mitigation measures, and also require Environmental Assessment (EA) registration and approval. 20-year management strategies require EA registration but do not include specific forestry activities; annual operating plans have very specific forestry information but do not require EA registration and approval.

[13] Both unalienated Crown lands and CBPP leased lands are managed under similar policies, and they will be discussed together unless indicated otherwise. The primary distinction is that planning documents for Crown lands are created by DNR Forestry, while planning documents for CBPP lands are created by CBPP.

Forest policy objectives stem from an Environmental Preview Report (EPR) prepared for the EA process in 1995 which greatly influenced the policy direction of forest management in the province. The EPR highlighted two policy objectives: 1) ecosystem-based management, including adaptive management; and 2) inclusive public participation. The objectives are explicitly linked because, as explained by DNR (1995): "adaptive forest ecosystem management requires the involvement of all stakeholders with an interest in the local forest land" (p. 7). These goals have subsequently been used repeatedly in forest policy language in the province.

Table 2. Provincial policies directly relevant to forestry and forest planning in Newfoundland.

Provincial policy	*Created and implemented by*	*Public participation requirements?*	*What does it do?*
Forestry Act (RSNL 1990 c F-23)	DNR-Forestry	No	Mandates planning for forest management districts, including 20-year/10-year management plans, 5-year operating plans, and annual operating plans; last amended 2008
20-Year Forest Management Strategies	DNR-Forestry	Yes	Current version: 2003 Sustainable Forest Management Strategy; outlines provincial forest management "philosophy and direction"
5-Year Forest Operating Plans	DNR-Forestry and CBPP	Yes	Management plans for sub-regions (districts or zones) of the province; specifies forest management plans
Annual Operating Plans	DNR-Forestry and CBPP	No	Provides specific locations and details of forestry activities annually and adherence to regulations
Past Annual Reports	DNR-Forestry and CBPP	No	Gives detailed information about all forest activities from the preceding year and compares them to proposed activities in the annual operating plans
Environmental Protection Act (RSNL 2002 c E-14.2)	Dept. of Environment and Conservation	Yes	Requires that all planning documents and major amendments to those documents be submitted for review to DEC Environmental Assessment process
Forest Protection Act (RSNL 1990 c F-22)	DNR-Forestry	No	Creates a Forest Protection Association

While these documents provide the framework for forest policy and planning in Newfoundland, they are shaped by a number of other provincial and federal commitments, strategies, and legislation. Provincially, a number of environmental laws impact forestry (Table 4). Provincial land use policies such as the Crown Lands Act (SNL 1991 c 36) and the Urban and

Rural Planning Act (SNL 2000 c U-8) may have minimal impacts on forest management. Policies that set aside parks such as the Provincial Parks Act (RSNL 1990 c P-32) and the Wilderness and Ecological Reserves Act (RSNL 1990 c W-9) impact forestry by reducing the available harvesting base. Forest management is strongly impacted by policies that conserve non-timber resources, including the Endangered Species Act (SNL 2001 c E-10.1) and the Water Resources Act (SNL 2002 c W-4.01) (Table 4). These acts are often implemented through Environmental Protection Guidelines, contained in the appendix of every forest operating plan, and through restrictions in wood supply analyses.

Table 4. Provincial policies impacting forest management in Newfoundland, arranged chronologically.

Provincial Policy	*Created and implemented by:*	*Public participation requirements?*	*What does it do?*
Historic Resources Act (RSNL 1990 c H-4)	Dept. of Tourism, Culture, and Recreation	No	Protects palaeontological and historic sites and regulates archaeological investigations and cultural property
Wild life Act (RSNL 1990 c W-8)	Department of Environment and Conservation; Wildilfe division	No	Regulates hunting and establishes wildlife officers
Provincial Parks Act (RSNL 1990 c P-32)	Department of Environment and Conservation	No	Provides for the creation and management of provincial parks; within parks, logging and cabin development are prohibited
Wilderness and Ecological Reserves Act (RSNL 1990 c W-9)	Department of Environment and Conservation; advisory: WERAC	Yes	Establishes an advisory council (WERAC) for reserve establishment; provides for the establishment of reserves, provisional reserves and wilderness reserves; within reserves, logging and building structures are prohibited; in wilderness and ecological reserves, motorized vehicles are prohibited; in ecological reserves, hunting is prohibited
Lands Act (SNL 1991 c 36)	Department of Environment and Conservation; Crown Lands	No	Grants Crown the right to grant, lease, and licence lands
Urban and Rural Planning Act (SNL 2000 c U-8)	Department of Municipal and Provincial Affairs	Yes	Creates the possibility for regional planning authorities and municipal and regional plans
Endangered Species Act (SNL 2001 c E-10.1)	Department of Environment and Conservation; advisory: SSAC	No	Establishes the mechanisms for designating a species as vulnerable, threatened, endangered, extirpated, or extinct, and for creating management and recovery plans, which may

			include critical or recovery habitat
Water Resources Act (SNL 2002 c W-4.01)	Department of Environment and Conservation	No	Regulates water use; may impact forestry in areas designated as public water supply

The provincial policies for DNR-Forestry and for other agencies overlap on the same land base, creating a complex decision-making environment and overlapping, sometimes conflicting, obligations among agencies.

Federal legislation primarily targets federal government actions (Table 5). However, several federal acts such as the Species at Risk Act (2002 c 24-29) have some impact on forestry in Newfoundland.

Table 5. Federal policies and legislation impacting forest management in Newfoundland, arranged chronologically.

Federal policy	*Created and implemented by:*	*Public participation requirements?*	*What does it do?*
Fisheries Act (1985 c F-14)	Fisheries and Oceans Canada	No	Affects forestry because of requirements for fish habitat protection (sections 34 and 35), impacting buffer zones
Canadian Environmental Assessment Act (1992 c 37)	Canadian Environmental Assessment Agency	Yes	Requires review of all federal government actions that have environmental effects on "lands of federal interest"; mandates extensive public participation
Canadian Environmental Protection Act (CEPA 1999)	Environment Canada	Yes	Takes a risk-management approach to government actions (mainly regarding pollutants)
Species at Risk Act (2002 c 24-29)	Environment Canada	No	Lists species as threatened, endangered, or extirpated at the federal level; outlines critical habitat and recovery plans; creates the Committee on the Status of Endangered Wildlife in Canada

In addition, at the federal and international level, a number of strategies and commitments have helped to shape the direction of forestry and forest policy in Newfoundland (Table 6). These documents indicate strong movement toward biodiversity conservation and EBM.

Table 6. National commitments and strategies influencing forestry in Newfoundland.

Federal commitment or strategy	*Created and implemented by*	*What is it?*
National Forest Strategy (1988, 1992, 1998, 2003)	Canadian Council of Forest Ministers	Affirms Canada's participation in international agreements such as the Convention on Biological Diversity, Framework Convention on Climate Change, etc.; mandates ecosystem-based management
Criteria and Indicators Framework	Canadian Council of Forest Ministers	Establishes sustainable forest management guidelines
Canadian Biodiversity Strategy (1995)	Joint Federal-Provincial-Territorial Biodiversity Working Group	Establishes a framework for biodiversity conservation in Canada, focusing on species protection
Canadian Boreal Forest Agreement (2010)	Multiple ENGOs and timber companies	A conservation agreement between ENGOs and private timber companies, including Kruger, covering licensed public lands in Canada

Five-year operating plans, created by DNR-Forestry and CBPP, are the focus of forest decision-making in the province (Figure 4). These plans are created through various inputs, including all the policies and commitments listed above, as well as the technical knowledge gleaned from wood supply analyses and the calculation of the Annual Allowable Cut, public input, and market signals.

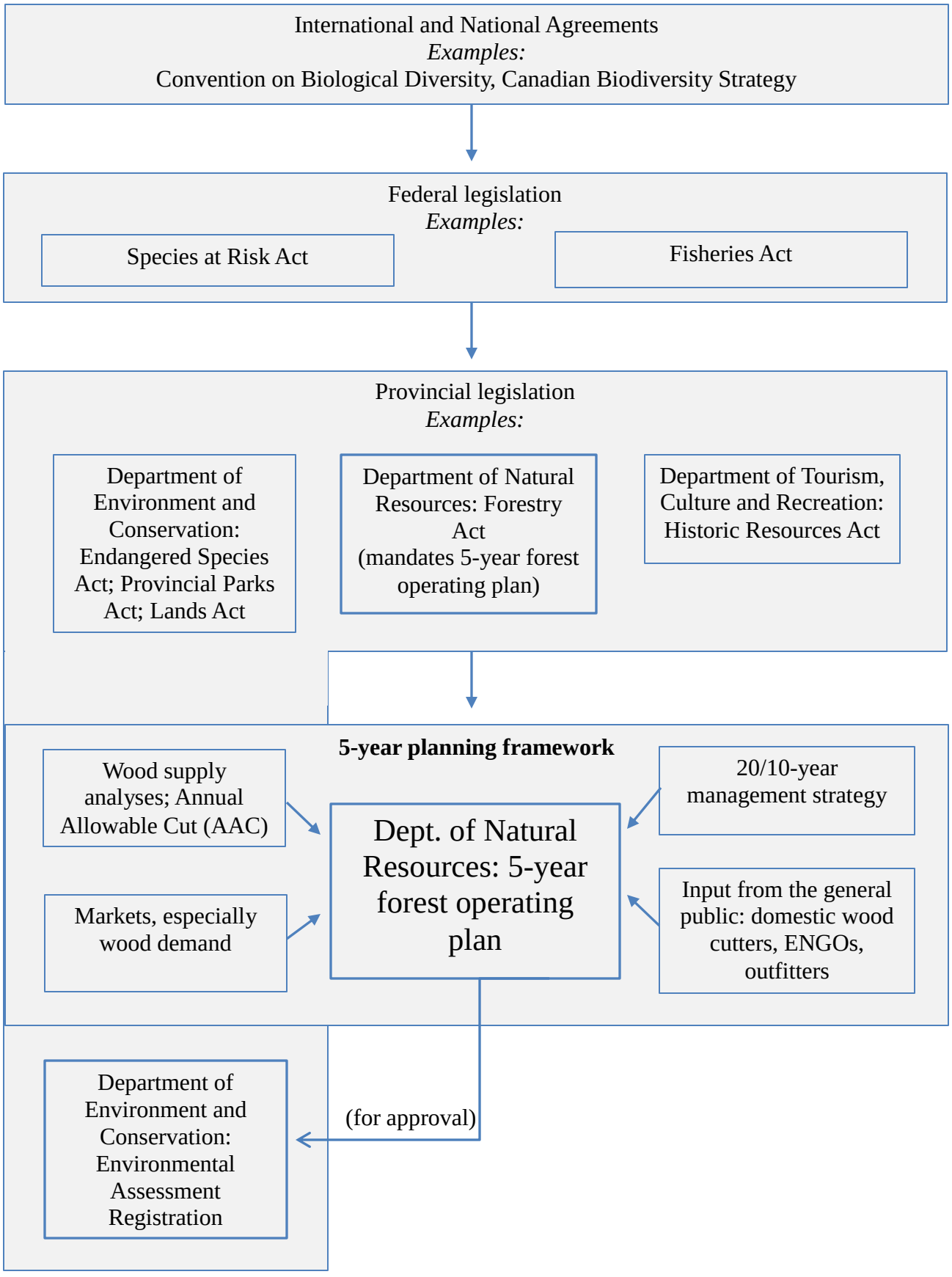

Figure 4. Inputs for the creation of 5-year forest operating plans in Newfoundland and Labrador. After the plan is created, it is submitted to the Environmental Assessment process for approval.

Forest plans are then submitted to the Department of Environment and Conservation EA process, which is mandated through the Environmental Protection Act (RSNL 2002 c E-14.2). The EA process requires that 45 days after submission of the plan, the Minister of Environment and Conservation has four options for a decision: 1) release the plan, possibly with additional terms and conditions; 2) require an environmental preview report; 3) require an environmental impact statement, which is more rigorous than an EPR and includes analysis of environmental effects of the plan and proposed mitigation measures or alternative actions; or 4) reject the plan if it is found to be contrary to law or policy. Members of the public have 35 days to comment on EA submissions and their comments may impact the Minister's decision. Both the EPR and EIS require further review and resubmission, with extensive additional scientific analysis necessary for the EIS; however, the vast majority of plans submitted are approved without an EPR or EIS. The Zone 5 plan, created by DNR-Forestry, which was submitted to the EA process and then withdrawn by DNR-Forestry for re-tooling and resubmission, provides an illustration of an EA process that defied typical approval patterns (discussed further in section 3.4).

Additional guidelines related to certification have impacted CBPP planning. CBPP currently has two forms of certification, ISO-9001 and Canadian Standards Association, and applied for Forest Stewardship Council [FSC] certification in fall 2011. Certification processes require additional obligations for forest planning and management, including more opportunities for public input. For FSC certification, there are requirements regarding management for conditions that emulate pre-industrial forest conditions.

I now proceed to a description of the implementation of these policies, through identification of challenges to ecosystem-based management and inclusive public participation (summarized in Table 7).

Table 7. List of some challenges to implementing EBM and inclusive public participation processes.

Challenges	Description	Possible outcomes
Ecosystem-based management		
Prioritizing timber within forest planning	Tendency within forest planning to prioritize timber allocation above other values; other values become constraints and are excluded from planning	Non-timber or non-commercial values are not operationalized and not fully integrated into planning
The regulated forest	Maintenance of regulated forest ideal, based on optimal timber allocation and sustained yield management	Linear planning is favoured over landscape analysis or multi-criteria planning
Competing agencies	Agency competition rather than collaboration in planning and management	Agencies mandates and objectives are viewed as separate "silos" and each agency must defend its territorial and policy purview
Insufficient protected areas	Protected areas system is not prioritized by the government	Newfoundland has a deficient protected areas network and uncertainty surrounding protected areas designations
Inclusive public participation processes		
Pre-ordained planning	Substantive decisions about forest management are made prior to public input	Public that does participate has limited ability to contribute to the process; one-way information flows
Differing expectations	Participants in planning have differing, sometimes unattainable or unclear expectations	Both public and DNR Forestry are frustrated with planning meetings
Limited participation	Small but vocal groups of the public participate in planning	Unrepresentative public, with limited range of views, are participating

3.2 Ecosystem-based management and forest planning

The 2003 Provincial Sustainable Forest Management Strategy hinges on "ecologically-based forest management" as a guiding objective for management. The strategy emphasis that EBM "requires an understanding of all forest values when making sound management decisions" (DNR -Forestry, 2003, p. 47), meaning that plans should incorporate multiple values. Some of these values are relatively easily defined and measured, and some will inevitably require

decisions based on incomplete evidence. Forestry in Newfoundland has continued to emphasize more easily defined and measured values to the detriment of other, usually non-timber values. This reflects a long-standing commitment to a narrow definition of forestry expertise steeped in wood availability analyses, and prioritization of commercial uses over other forest values. The following sections illustrate these claims.

3.2.1 Prioritizing timber: wood analysis and the Annual Allowable Cut

> *The objectives, from our perspective, was to put forward a forest harvesting plan that was going to allocate the allowable cut* (19, DNR forestry).

A Sierra Club document (Plotkin, 2004) provides insights into ENGOs' concerns about forest management in the province by asking: is ecosystem-based management being implemented? The authors' findings are largely negative; their primary criticism is that the only carefully quantified measurement included in management is the Annual Allowable Cut [AAC]. The report highlights the Province's commitment to maintaining industrial practices in the face of EBM requirements and consistently vague definitions given to non-timber values.[14] Despite mandates within the 2003 Sustainable Forest Management Plan, DNR Forestry has not created EBM guidelines (Auditor General, 2011), indicating that government has perpetuated vague, difficult-to-measure parameters for non-timber values.

To understand the persistent commitment to commercial wood use, I begin with an explanation of the quantification of the AAC, which forms the basis of forest planning, as described by a DNR-Forestry interviewee: "in the mid-90s, we started making harvest plans; it gave the AAC some concreteness. It gave people some idea of what forestry was doing" (1, DNR-Forestry). The very concreteness of the AAC has tended to give it priority in terms of forest planning, leading to decisions based on the *certainty* of the planning exercise.

Currently, the AAC, or allowable rate of cut on productive Class I forest lands, is determined through the use of two models: an aspatial model called Woodstock, and a spatial model called Stanley. These models are used to optimize forest planning, which means maximizing harvests, given a number of non-timber requirements. The process of determining AAC begins with the aspatial "optimum," which is then restricted through multiple rounds, each decreasing the flexibility of the model to optimize harvest. With every limitation on the model,

[14] With the exception of District 19a in Labrador

the AAC drops because the model has less flexibility for allocating harvesting. In other words, with each requirement, the model produces a lower AAC. This occurs in layers. First, the modeling exercise is limited because of requirements for even-flow harvesting, meaning that the AAC must be equal in every 5-year period of the 160-year planning horizon. Second, the model is limited spatially, through the spatial analysis software and through "blocking," which is accomplished by district managers, who block harvests over their districts within the even-flow harvest requirements. Third, the model is limited through the deduction of "other values" from the AAC, which may be operational constraints, such as steep slopes or isolation of stands; or disturbance constraints, such as insect infestations, diseases, or fire events. The most contentious deductions arise through environmental requirements. This has led to pushback from some managers and directors within DNR-Forestry, as the agency has lost some control over the land base: "we're losing our land – the land base is eroding because of preserves and habitat areas" (23, DNR-Forestry).

The uncertainty of non-timber values and environmental requirements has caused consternation. The AAC is based on precisely quantified variables in the wood supply analysis: 1) existing forest resources, based on inventories and previous management; and 2) yield curves based on a number of criteria including species, site class, and growth conditions. Other non-timber values, such as wildlife, have a great deal of uncertainty; one interviewee from the Department of Environment and Conservation [DEC] said: "That's the problem, we can't put it on a map and then say here it is and this is it forever and ever, it's like okay it's got to be adaptive, it's got to move and that causes problems for industry, they don't want it to move, they want to be able to plan around it" (47, DEC).

AAC determination has created a chasm between DNR-Forestry and industry on the one hand, and ENGOs and other government departments on the other, in terms of whether the models adequately capture non-timber values: "every time we say you can't harvest there, their AAC goes down… whether it's parks, wildlife, tourism, whether it's outfitters, it takes away from what they have because they allocated everything" (47, DEC). At a meeting in the Northern Peninsula, this view was illustrated by a forester who said that the forest industry was "always giving ground" while other stakeholders made more and more demands.

The current forest planning strategy optimizes harvests then deducts other values, rather than planning for a range of values – including non-timber values – from the beginning. This is especially problematic for values that do not have a clear threshold for management, such as

tourism: "there is no criteria-based process to balance competing uses… it's a forest cutting plan that decides how much, where, and when forests will be harvested" (51, Dept. of Tourism, Culture and Recreation).

Despite continued reliance on traditional wood fibre optimization assumptions, the forest management emphasis is shifting, though not necessarily because of policy requirements or planning. A number of people, including many in DNR-Forestry, pointed to the decreased market demand for wood fibre in Newfoundland as a reason for managing for non-timber values and for letting the forest "rest." Though the Annual Allowable Cut has remained fairly steady over every 5-year period since at least 1991, with 2.41 m^3 AAC for 1991-1995, 2.09 m^3 for 1996-2000, 2.35 m3 for 2001-2005, and 2.33 m^3 for 2006-2010, actual harvest has been lower than AAC (Auditor General, 2011). The evenness of AAC indicates that planning continues to follow status quo assumptions, even in the face of decreased demand, while practice more closely follows actual demand. The discrepancy between AAC and actual harvest does not explicitly address non-timber concerns, though it may unintentionally benefit them.

Even as demand for wood fibre declined, DNR-Forestry District Managers, who actually implement policy, did not receive direction about alternative ways to carry out forest management and planning. Several managers spoke of a "transition" in terms of management, but a transition without clear direction:

> Mill closures have been kind of going on for 6 or 8 years, but it's almost as if we're still in transition here and we haven't made any huge decisions about scaling back… there's a certain expectation that we free up some of this resource for other things and what I'm asking for is direction. (15, DNR-Forestry)

The long-standing links between forest management, societal benefits through industry activity (employment, wood products), and forest health from a sustained-yield perspective have dissolved: "I have a responsibility to ensure that forest is there in some kind of a healthy state that future generations will get some benefit from. I have no idea what, in the absence of industry, that would mean" (16, DNR-Forestry). New linkages appear to be slow in forming, and there is a gap between EBM in policy and mechanisms for implementing policy.

3.2.2 The regulated forest

Though policy language has shifted to EBM, the language of silvicultural treatments has remained largely wood fibre-focused. This is reflected in policy language regarding the regulated

forest, a hypothetical ideal wherein the landscape is divided equally into age classes, with "20 percent of each age class maintained on the landscape" (23, DNR-Forestry). A regulated landscape is harvested in shifting mosaics of clearcuts, with retained corridors around streams and for habitat.

Many of the most economically viable harvest ages, from about 60-80 years old, have been accessed, leaving stands with lower economic value and less volume remaining. The age class distribution in most of Newfoundland's forests is concentrated in the young (under 40 years) and older (over 80 years) forests (DNR-Forestry, 2006). These deviations from the regulated forest have shaped the language of silvicultural treatments in Newfoundland: "forest management strategies have been developed to address the intermediate forest age gap" (DNR-Forestry, 2006, p. 2). These include: thinning young stands to expedite growth, protecting older stands from disturbances so they may be harvested, and harvesting oldest stands first (DNR-Forestry, 2006).

These strategies to attain a regulated forest clearly prioritize regularity and predictability of harvest over other values. A regulated forest is meant to provide predictable harvests over a period of years, with the goal of sustainably harvesting the landscape in cycles. This emphasis on a predictable harvest raises questions about management for other values of EBM, for example the roles of old forests and disturbance patterns.

DNR-Forestry recognized some of the values in old forests when it developed old forest targets requiring that 15% of the productive forest within each district be 80 years or older. The intended benefit of this target is "to provide a coarse-filter approach to maintaining biodiversity" (DNR, 2003, p. 39). Though the 15% target is often surpassed (DNR-Forestry, 2011a, p. 50), there is very little evidence for its effectiveness in maintaining biodiversity, partly because such a metric ("biodiversity maintenance") is absent from planning documents. Harvesting in old forests has created conflict between environmental groups and forest industry in Newfoundland in the past (Janes-Hodder and Sinclair, 2006) and the continued emphasis on a regulated forest indicates a tendency for forestry on the island to maintain a wood products orientation.

Though the regulated forest has not been attained within the province, its language within policy is problematic because it may conflict with the stated goals of adaptive EBM, which includes maintenance of disturbance regimes and other ecological processes (Grumbine, 1994) and "attempts to maintain the complex processes, pathways and interdependencies of forest ecosystems" (Society of American Foresters, 1993). The regulated forest is a model of the linear,

timber-oriented ideal based on equilibrium and the attainment of "balance." It has been applied across many landscape types and does not incorporate either spatial or temporal adaptation. The regulated forest ideal is out of step with "new forestry" models and silvicultural prescriptions that include the importance of disturbance, non-linearity, and disequilibrium (e.g. Puettman et al., 2008). For example, in western Newfoundland, which had insect infestation-driven disturbance, "emulating the natural disturbance regime would involve a much different silvicultural approach than the actual wall-to-wall clearcutting regime" (Jardon and Doyon, 2003, p. 28). Jardon and Doyon (2003) found that approximately one-third of sampled stands exhibited stand replacement disturbance, while other stand structures, including multi-cohort stands, dominated the remainder of sampled areas. This landscape- and stand-level complexity is not a clear objective of the current silvicultural regime.

Diverse forest values and functions may or may not be fulfilled through the regulated forest ideal, but there is a distinct lack of reflection on whether silvicultural prescriptions based on the regulated forest are achieving a range of forest functions. EBM likely requires both areas of unmanaged forest and areas of intensively managed forest to conserve aspects of biodiversity (e.g. McNeeley et al., 1990). The current model in Newfoundland is not a scientifically selected series of managed and unmanaged forests, but a regulated forest spread evenly across the managed areas of the landscape, while 82% of the land base is excluded from timber (and therefore most forest) management. Integrating these lands into models would allow DNR-Forestry to better assess its management impacts.

Although the 1990 Forestry Act mentioned sustainable forest management objectives, it did not provide means for achieving these objectives. Its emphasis was on sustained yield objectives and forest management activities such as:

> "constructing and maintaining forest access roads; protecting the forests of the province from fire, insect and disease; carrying out programs of afforestation, reforestation, forest improvement and tree improvement; cutting, classifying, measuring, manufacturing, marking and inspection of trees and timber; preparing timber management plans for areas of productive forest land; and developing and maintaining an up-to-date inventory of the timber resources of the province" (RSNL 1990 c F-23 (I)(4)(2)(a-f)).

This is in contrast with the management objectives proposed in later documents, particularly the 2003 Sustainable Forest Management Strategy. Read in isolation of subsequent strategies and plans, DNR-Forestry would meet its objectives through allocating the AAC, road

construction, and fire, insect, and disease suppression. This contrasts with the language and intent of the 2003 strategy (Table 8). In the table, two types of forestry are contrasted – "scientific" forestry and "new" forestry. Scientific forest management was introduced to North America in the late 19th century, when professional foresters began training in silviculture and government bureaucracies were created to administer and regulate forest operations. In the 19th century and through most of the 20th century, forest management focused on maximizing profit through efficient wood production and intensive management (Puettman et al., 2008). This indicates an adherence to a utilitarian model of forestry, in which the forest is viewed primarily as a fibre factory, and human expertise and judgment are utilized to rationally and efficiently produce timber and other outputs (Bliss, 2000). In this view, human manipulation in the forest creates predictable results, and planning is primarily an exercise in the application of recognized, concrete principles to a predefined problem.

But many values are not easily captured or even defined; Owen et al. (2009) found that some of the values associated with old growth forests, such as spiritual, intergenerational, cultural, and ecosystem values, may not be reflected in forest planning but are still central to many people's assessment of forest conditions and their attitudes toward management. Beginning in the late 1980s, new types of forestry began to emerge that included decision-making flexibility, reintroduction of natural disturbance processes, and EBM (Swanson and Franklin, 1992). These new forestry methods are implied by directives within the 2003 Strategy, though as noted previously, the mechanisms for District Managers to achieve these objectives have not been developed.

Table 8. Overview of the Forestry Act, the prevailing legislative framework for DNR-Forestry, and the 2003 Sustainable Forest Management Strategy, the guiding document for planning.

Forestry Act (1990, plus amendments)	Sustainable Forest Management Strategy (2003)
"Scientific" forestry	"New" forestry
Linear	Holistic
Utilitarian	Biocentric/ecocentric
Focus on: road construction, silviculture, timber management	Focus on: sustainability, ecosystems, public involvement
Language: "sustained yield forest management"	Language: "Forest ecosystems are managed to maintain their ecological integrity, productive capacity, resiliency, and biodiversity."

Adhering to the Forestry Act may allow DNR-Forestry to emphasize the AAC and the regulated forest, but the department has then ignored non-timber values, possibly under the impression that "that's not our mandate" (56, DNR-Forestry). For example, the Environmental Protection Guidelines, which are appendices to every 5-year Plan and which provide guidance for on-the-ground implementation, are entirely focused on harvesting, road building, and other traditional forestry activities. As outlined in the 2003 Strategy, and as the Auditor General (2011) made clear, EBM *is* part of the DNR-Forestry mandate; however, the means to implement that mandate are lacking.

3.2.3 Competing agencies

While EBM should be integrated at the landscape level and with the input of multiple agencies, competing mandates for various provincial government departments and agencies have led to land use conflicts amongst agencies at the forest planning table; most notably between DNR-Forestry and Wildlife, Parks and Natural Areas, and Tourism. Though many in DNR-Forestry noted that other agencies refused to participate fully in forest planning, members of other agencies expressed a number of frustrations and concerns that they felt were not adequately addressed by forest planning. Concerns expressed by various government agency employees were primarily about the prioritization of wood fibre within forest planning, which made the integration of non-timber values very difficult. Rather than a coherent or integrated consensus process, agency employees must each defend their own interests at the planning table. Because

forest planning is virtually the only land use planning occurring in the province, these battles may pit DNR-Forestry against other natural resource and land use agencies. As one manager from DNR-Forestry explained:

> These planning processes that we go through for each district, or each zone now, is probably the only sort of land use planning that goes on in this province. So you get all these stakeholders around the table, wildlife included, other government agencies… I'm trying to manage the forest resource, and you have line managers with the Department of Environment and Conservation who are there to try and ensure there's a healthy caribou population, managers from Department of Agriculture trying to maximize food production and we're all sort of fighting around the table for a piece of the pie, without any strategic direction… what I'm asking for is direction, and so okay, what is the priority, what is government's priority? (15, DNR-Forestry)

Agencies aside from DNR-Forestry may have difficulty describing the economic benefits of their industries, or measuring how economic benefits relate to particular forest activities. One employee of DEC stated that "[Forestry] was the huge economic generator; it generates high paying good full time jobs. If there was a conflict… forestry won every time" (47, DEC). Government agencies outside of DNR-Forestry were therefore accorded some input into plans, though their input may not have been well integrated or reflected in the content of final plans. Rather, planning was a negotiation between commercial forestry and non-timber interests, with DNR-Forestry corroborating the interests of commercial forestry.

These difficulties have led many agencies to bypass the public input processes of the five-year operating plans and submit comments directly to the Environmental Assessment process, creating frustration for DNR-Forestry. Forest managers viewed this as non-cooperative, and in meetings, executives of DNR-Forestry described the five-year planning process as "not working" because agencies approached EA directly.

DNR-Forestry may have been hesitant to give up its central role in forest and land use management because: "it is risky to give up the land base to somebody else like parks or wildlife" because commercial demand could return (48, DNR-Forestry). But this arrangement is changing regardless with the decline of forest industry and the rising importance of other natural resource industries with clear economic benefits for the province and clear land use needs (e.g. mining, oil and gas exploration, municipal development). Oil extraction now accounts for 27.5% of provincial GDP, mining is 6.7%, construction is 5.3%; forestry and logging accounts for just

.5% of GDP (Department of Finance, 2010a).[15] This highlights the need for other sectors to be involved in EBM, not just DNR-Forestry. The policy mandates and public expectations placed on DNR-Forestry currently exceed its expertise and available policy tools.

In addition to public planning processes, there were also in-depth, long-term planning groups that occur behind the scenes, with members of multiple agencies and outside members of the public contributing their expertise. These processes have included species recovery teams, such as for the pine marten, and were, through the 1990s, coordinated through Model Forest Newfoundland and Labrador. After that time, long-term interagency planning group activity dwindled. Several such processes are currently underway, including a Connectivity Working Group, though their activities have thus far been research-oriented and their contributions have yet to impact forest policies or management. These processes have provided a great deal of cooperation at low levels within the agencies which is largely absent in decisions at the administrative levels and in policy.

Another source of frustration for many in government, especially employees in Wildlife, Tourism, and Protected Areas, is the view that priority has been placed on operational flexibility and predictability for various industries before the concerns of other forest users and values. For example, in the 5-year operating plans, more wood volume is allocated per district than the AAC to allow for "operational flexibility" and inventory deviations without having to amend the plans (DNR-Forestry, 2011a), without similar allowances for other users. A second example is the repeated delay in creating the Natural Areas Systems Plan, likely delayed because of mining (discussed in section 3.2.4).

A third example is the failure of government to list several species recommended by the species status advisory committee for designation under the provincial Endangered Species Act. The Lieutenant-Governor in Council has 90 days after receiving a recommendation to either designate the species or make no designation and "release to the public the reason there will be no designation" (SNL2001 c E-10.1 8(c)). Twelve species were recommended in May 2008, seven for endangered status, four for threatened status, and one for vulnerable status. As of March 2012, none had been designated and there has been no public explanation regarding government's decision. The species appear to be in bureaucratic limbo and there is no recourse for government inaction aside from litigation. The listing of most of the proposed species would

[15] These figures include both Newfoundland and Labrador.

have little direct impact on forest operations. However, the failure of government to follow its own conservation legislation indicates the lack of importance granted to EBM and government's apparent hesitancy to implement policies which may complicate natural resource planning or exclude opportunities for resource utilization.

3.2.4 Insufficient protected areas

A particularly trenchant example of competing mandates is found in the creation of protected areas. EBM places great importance on protected areas, which are intended to capture a "complete" ecosystem, defined as: "one whose boundaries reflect ecosystem and population processes and patterns, providing sufficient area, diversity, and complexity for continued self-organization and self-maintenance in the absence of catastrophic external disturbances" (Slocombe, 1993, p. 613). In a telephone survey of 402 residents of the province, 87% of respondents indicated that they supported the creation of more protected areas (explicitly identified as areas which prohibited many industrial activities); this proportion was similar across all regions, income and education levels, and age brackets (Corporate Research Associates, 2011). In the same survey, 77% of respondents said that protected areas offered "opportunities for economic growth and job creation" (Corporate Research Associates, 2011, p. 8). There is clear public support for maintaining and expanding protected areas.

Despite this support, protected areas legislation has stalled. The Wilderness and Ecological Reserves Advisory Council (WERAC), a group of 11 volunteer members, including scientists, community and environmental activists, and others interested in conservation and land use, was authorized by the Wilderness and Ecological Reserves Act to report to the Minister of Environment and Conservation regarding the creation and maintenance of wilderness and ecological reserves. Since 1995, the Minister of Environment and Conservation has been in the process of establishing a Natural Areas Systems Plan (NASP), a province-wide system of reserves. NASP has remained within the machinations of Provincial government since 1996, and is "currently undergoing internal conflict resolution among the various Provincial Government Departments" (WERAC, 2010). In its 2011 Blue Book, the Progressive Conservative party underlined the importance of NASP to delineate areas available for activities such as mining exploration (PC, 2011).

WERAC has met with multiple community groups across the province to discuss suggested reserves, but most of its recommendations have not been processed by government. Therefore, local conservationists, many of whom met with WERAC to modify or suggest new reserves, are unable to proceed with plans (47, DEC). Many of the suggested reserves may not be implemented because of conflicts with other departments, but the net action at the ministerial level appears to be delay: since 2007, WERAC has not had full membership, and

> repeated requests by WERAC for the completion of the appointment process have not been addressed. Furthermore, the Minister [of Environment and Conservation] has indicated that she will only meet with WERAC after the appointment process has been completed. This situation has effectively minimized WERAC's ability to assume its legislated mandate (WERAC, 2010, p. 3).

According to one WERAC member, "most of us that were on the committee were like, if you don't want this [NASP] then just tell us and we'll stop wasting our time. At least have the courtesy to talk to us" (47, DEC).

This inaction may be connected to the desire within government to provide some stability for a struggling forest industry, as another WERAC member said "people like myself come along and say, what about you preserve a part of your tenure for forest conservation area, and it's like asking for the moon, they resist that quite strongly and quite successfully to date" (4, WERAC member). But many interviewees indicated that it was the rising importance of other, non-forestry natural resource industries, such as mining and oil and gas, which complicated the approval and implementation of NASP. Mining and oil and gas both require extensive area for exploration and much of Newfoundland is considered "unexplored." About 90% of the island of Newfoundland is open to mining exploration; the only lands that are excluded are current protected areas and proposed protected areas under NASP (DNR Mines Branch, 2011). Placing permanent protection on those lands under NASP may exclude those industries in the future.

3.3 Public participation

Public participation and input is a second major policy objective that I have identified, in addition to EBM. The two concepts are complementary; EBM is incomplete without public involvement and the integration of social considerations in planning and decision-making (Endter-Wada et al., 1998). This is not to suggest that incorporating public values and other EBM objectives will always align; in fact, conflict and complexity are virtually guaranteed to

increase with more voices contributing to planning. But public input is required to determine values for forest management. In fact, the mission statement of the wood supply analysis process is: "to manage, conserve, enhance and use the forest ecosystems of Newfoundland and Labrador using adaptive management to ensure its sustainability and productivity with the appropriate balance of values *desired by society*" (DNR-Forestry, 2006: 1, emphasis added).

A number of forest policies mandate public participation in some form. For example, the 2003 Sustainable Forest Management Strategy identified a need to "establish a proactive planning framework to include stakeholders," (DNR-Forestry, 2003, p. 2). The Environmental Preview Report (DNR-Forestry, 1995) provided the most explicit direction regarding public participation, including the creation of Public Advisory Groups and long-term Planning Teams to "jointly develop goals and objectives and identify the issues and concerns for the management of the local forest ecosystems" (DNR-Forestry, 1995, page 16). Planning Teams were also intended to co-monitor management implementation and the outcomes of forest management, comparing "the measured state of the forest… to the target state" identified by the planning team (DNR-Forestry, 1995, page 17).

However, the public input processes described in the Environmental Preview Report and in the 2003 Sustainable Forest Management Strategy have largely not been attempted. Determining social values through the public input process has proved frustrating for both forest managers and planners and public participants. The preferred channels of participation are through public meetings held for the development of forest plans, though many ENGOs and others have participated through comments to the Department of Environment and Conservation during the Environmental Assessment process because of frustration with public meetings. The sources of frustration include: 1) plans are already substantively finished when the public is brought in for consultation; 2) public expectations exceed the mandates of DNR-Forestry; and 3) non-timber concerns are treated as constraints, rather than integrated into plans and therefore public input is limited to obstructionism.

3.3.1 Pre-ordained planning

> *The initial planning that should be happening with this is what are we doing, how do we wish our lands to be developed, and what's appropriate for an area and what is not* (2, ENGO)

It was apparent through interviews that many participants were unsatisfied that their input was valued or incorporated into planning. The primary reason cited was that planning had already occurred, and consequently public participants were able to only make small changes, to push at the edges of pre-ordained plans. Rather than being brought in at the beginning of a plan, participants were faced with maps that already showed suggested harvesting areas: "there will be a public meeting, we'll have maps, showing where our proposed harvesting areas are for the next 5-year period. So they will be put up for people to look at, evaluate. And if there are issues, we'll try to mitigate" (16, DNR-Forestry). Every concession granted would then subtract from the AAC by reducing flexibility for the commercial forest operators:

> The Forest service or industry would come to the table and they would already have the values worked out for the landscape… there was no *tabula rasa* if you will, like let's get together and say what kind of value do we have for this landscape and what do we want to decide on. It was already set on commercial forestry as the value and everything else would be secondary or tertiary to that. (4, WERAC member)

Rather than public consultation or a two-way flow of information, the 5-year planning meetings became one-way flows of information about the decided-upon course of action. In the words of an employee of DEC: "it's not like, 'well tell us where the places you think are important and then we'll put our plan around that,' they don't have that flexibility. It's already all allocated, they know where they have to harvest" (47, DEC).

In effect, public input was dealt with on a case by case basis, with no clear mechanism for ranking or evaluating public values. As mentioned above, this led some stakeholders to bypass the preferred public participation process in an attempt to obstruct plans once they were submitted to the Environmental Assessment. This contributed to frustration for district managers, though "people who have dropped out of the process, it's understandable. They didn't have a lot of input into the plan" (22, DNR-Forestry).

The EA process has proven a useful tool for ENGOs to push consideration of non-timber values, though it can only kick plans back to DNR-Forestry, rather than integrating multiple values into plans. But for forest planners, "we'd prefer it [public input] be done proactively… if the comments come in early, then you can mitigate" (49, DNR-Forestry). The question is whether mitigation after the fact is appropriate. The expectations of ENGO members can be very difficult to capture in the current atmosphere of pre-ordained public planning and after the fact mitigation: "You're going to get the odd person going in there who's got the time and the energy,

who's tenacious enough to keep whacking away… [but] the terms of reference are controlled by who is at the table" (2, ENGO).

3.3.2 Differing expectations

> *Because there's no other avenue for the public and stakeholders we end up looking like the bad guys because we're trying to consult the public… it's sort of a medium for the public to vent frustration or try to get their values protected.* (15, DNR-Forestry)

DNR-Forestry five-year operating plans are one of the few opportunities for many Newfoundlanders to have a voice in land use planning. Because DNR-Forestry is decentralized, with offices in many rural communities across the province, it is a direct connection to provincial government for many rural people. Many who participated in these forest planning meetings expected much more than DNR-Forestry can deliver:

> We have public meetings, we go out there and say here, come, participate… a lot of people will say it's flawed. They'll say they don't get their own way, but we have a responsibility to manage forests, so to say we're going to set everything aside for other values, no, it's not going to happen. (16, DNR-Forestry)

While the focus of DNR-Forestry continues to be allocating commercial AAC, individual citizen concerns often centre on domestic wood cutting, access to cabins and cutting near cabins, viewshed issues, and hunting, fishing and trapping. Some of these values are incorporated under current planning mechanisms, as buffers can be left for viewsheds and plans have provisions for domestic cutting such as designated cutting blocks. Many non-timber or non-commercial timber values have been incorporated on a case-by-case basis, for example, individual cabins can be avoided in harvest plans as part of mitigation. But there is no overarching system for prioritizing values, or for landscape-level planning.

Five-year planning meetings also tended to be dominated by one type of expertise – scientific forestry – with guest speakers who briefly presented other forms of knowledge and perspectives, such as wildlife habitat or tourism. This approach would be appropriate if the goal was producing a wood fibre plan; but its effectiveness is questionable if forest planners are trying to integrate non-timber values. Further, giving the public a meaningful forum for discussing values is difficult when highly technical information is presented and concerns are dismissed. Participants at meetings may not speak up, indicating that they consent to plans as written;

however, they may need time to come to terms with what is on the table and how they can impact it.

3.3.3 Limited participation

The bulk of the public, from people in rural communities who are directly impacted by harvests to those employed by the forest industry to recreationists and others who use forests for non-timber purposes, do not participate in public meetings. This means that though public meetings can gather polarized viewpoints and individual concerns, general public input is lacking, as is the ability of forest planners to gauge public values. Public apathy and low attendance at meetings could indicate satisfaction with status quo planning, but such an assumption may be dangerous, given that Bath (2006; 2010) found residents split over whether forest management in Newfoundland was done well or sustainably, with majorities indicating that forest management was harmful in terms of habitat and other non-timber values.

In addition, while many members of ENGOs indicated that they went to public meetings, at least for a time, most "burned out" at some point and stopped participating, leaving very few participants. As members of ENGOs and outfitters stopped attending, or refused to attend meetings, their views could be more easily dismissed: "[ENGOs] were like little dogs at the heel, kind of yap from the outside… and forestry and government would say well, we have the process and you're not involved, too bad, you had the chance" (4, WERAC member). Though ENGO members are undoubtedly in the minority of the Province, their views and expectations regarding forest management seem to be supported by many residents and certain ENGOs, such as the Protected Areas Association, are perceived as more credible than either government or the pulp and paper industry (Bath, 2006; Bath, 2010).

A document from a community values mapping project in 1996 reveals the extent of frustration felt by some ENGOs, and the importance placed on inclusive public participation: "change is desperately needed. Change that includes genuine and substantial consideration of culture, cherished and sacred places and other values within communities … residents wish to take a more comprehensive approach to planning" (Young and Coates, 1996, p. 2). This frustration has largely continued through planning efforts to today, as one ENGO member suggested that "people are discouraged, they know [meetings] don't work" (10, ENGO).

3.4 Case study in challenges: 2011 Zone 5 Operating Plans

The preparation of the Zone 5 five-year operating plans in 2011 allows a critical look into the implementation of forest management planning, particularly the difficulty of incorporating public participation and the continued emphasis on commercial harvests. The creation of the Zone 5 plan also illustrates several promising policy directions from within DNR Forestry, as the department has used this window of lowered wood fibre demand to create an innovative, large-scale caribou research project.

Zone 5 includes Districts 10, 11, 12, and 13 in central Newfoundland, all of which were largely controlled by Abitibi Consolidated [Abitibi] until Dec. 16, 2008, when they were expropriated and turned over to Crown management, just before their expiry date of 2010. As background, Abitibi's timber licenses had staggered expiry dates from 2002 until 2021. In renewing the first wave of expirations, about 380,000 ha in 2002, the government harmonized the expiration dates of all Abitibi's licenses, which totalled over 960,000 ha, to 2010. While extending the licenses for Abitibi gave the company some tenure security, it did not address the long term issue, which was at that time a possible wood supply shortage. In a government press release dated November 26, 2002, then-Minister of Forest Resources and Agrifoods, Rick Woodford, said that harmonizing the dates "will give government reasonable time to deal with the longer term issue, which will involve *comprehensive public consultations* before the 2010 expiry date for all of Abitibi's licenses" (emphasis added).

Bill 27, passed in 2002 as an amendment to the Forestry Act, outlines the terms of extending the licenses. Section 13.1(4) of the Forestry Act was amended to read:

> Commencing not less than 12 months before the expiry of the licenses … the minister shall initiate and conduct a public consultation process with participants in the forest industry as well as interested individuals, groups and affected communities to explore and consider the full range of forest uses in relation to the areas covered by the licenses. (RSNL 1990 c F-23 §13.1(4))

However, these public consultations did not occur; rather, DNR-Forestry relied on the standard five-year operating plan public meetings as a substitute for more thorough discussions. As emphasized in section 3.2.1, the "full range of forest uses" may not be the topic of discussion for meetings that are predicated on allocating harvests, with all other values serving as constraints.

But the lack of full public consultation was the result of a decision by the NL government to plan for the forests as typical unalienated Crown lands. The leases did not actually expire on the Abitibi lands – the company lands were expropriated prior to their expiry, and so government may not have been legally obligated to conduct comprehensive public consultation. However, the government's response, which was to proceed as though the Grand Falls mill had not closed, meant that a crucial transition went unacknowledged, particularly between DNR-Forestry and the Zone 5 region. Debate over the necessity of comprehensive public consultation continues.

The initial Zone 5 five-year operating plan was therefore created after the standard five-year operating plan public meetings. There were a total of 14 meetings throughout 2010.[16] Meetings were chaired by an employee of DNR-Forestry. An average of 30 people attended each meeting, with an average of 40% of participants, or 13 people per meeting, from government. Other participants included private citizens and woodcutters (approximately 7 people per meeting on average), members of sawmill, logging, and value-added wood sector (5), and outfitters and tourism operators (3). No members of ENGOs participated.

The first two meetings established ground rules; meetings 3-11 largely consisted of presentations from government agencies, plus forest industry and outfitters; and meetings 12 and 13 involved discussions of concerns. Meeting number 14, which occurred 6 months after meeting 13, was a summary discussion of the proposed plan. Presentations largely involved one-way flows of information, although individual questions were asked. According to the minutes, it was not until the end of the process (meetings 12 and 13) that the plan as a whole was discussed and systemic problems were brought to the table, including a perceived lack of representation from non-timber values. At meeting 11, the meeting chair explicitly stated that meetings 12 and 13 would be dedicated to "discussing the five-year plan, identifying potential concerns and determining appropriate resolutions."[17] Participants were largely directed to submit comments online, and time ran out for further discussion of issues at several meetings.

A number of concerns were mentioned throughout the meetings that were identified for mitigation or further review: domestic wood cutting, road decommissioning, aesthetics and viewsheds, wildlife habitat, agriculture, water supply areas, municipal boundaries, impacts on outfitters, cabins, and protected areas. This suite of concerns indicates that many non-timber issues were raised, but they were not integrated into the plan prior to creation of the harvest

[16] Data regarding attendance and topics is from meetings #2-#14; notes were not available from the first meeting
[17] From meeting minutes for Zone 5 five-year operating plan, page 2

maps; rather, they were brought up for "mitigative actions." In effect, people were welcomed to comment on the plans, but the bulk of actual forestry activity was already determined.

The plan was registered January 4, 2011 with Environmental Assessment at the Department of Environment and Conservation. In letters to the DEC, ENGOs asked for a full environmental impact statement, which would require further data collection and analysis, because of possible significant effects to woodland caribou and Newfoundland marten, deferred harvests in core caribou areas as identified through an ongoing collaring experiment, and identification of salmon spawning areas.[18] The fact that ENGOs submitted comments to the EA process but did not attend the public meetings indicates a level of dysfunction in public participation. In interviews, several ENGO members indicated that they would not participate in a process that was tokenistic. They instead took the arguably more combative role of requesting changes to the plans *after* submission to EA.

The Zone 5 operating plan was withdrawn from EA by DNR-Forestry, an unprecedented action. The plan was resubmitted July 7, 2011 and eventually released. The original submission and resubmission were essentially identical, save for a section in the resubmitted plan (pp. 136-157) detailing the caribou Adaptive Management Strategy and minor changes to AAC in Districts 10 and 11. In the interim, members of DNR-Forestry met with several members of ENGOs, though additional public meetings did not occur (13, ENGO). Therefore, the ENGO action of appealing directly to the EA process had some success from the perspective of the ENGOs, but broad public participation still did not occur.

The Zone 5 plan allocated a full AAC. A portion of this was for the use of nearby sawmills, but much of the allocation was intended for a speculative, new small-diameter fibre operation in at the old Abitibi site in Grand Falls. The government advertised an Expression of Interest in 2009 for industrial development of the small-diameter wood fibre on Abitibi's former lands. Though there have been rumours of viable offers, no companies have committed to developing the Grand Falls operation. But government has attempted to pursue options to effectively reinstate status quo pulp and paper operations, despite industry downturn.[19]

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[18] Letters were from: Atlantic Salmon Federation; Canadian Parks and Wilderness Society; a consortium of federal groups (CPAWS, Canadian Boreal Initiative, Canopy, David Suzuki Foundation, Forest Ethics, and Greenpeace; Ian Goudie; and Sierra Club Atlantic.

[19] Several CBC articles detail the possible interest in the Grand Falls mill by Lott Feinpappen GmbH & Co., a company that had been purchased by a private equity firm specializing in the takeover of "unprofitable" and "distressed" businesses; the deal fell through when Lott filed bankruptcy and Motion Invest accused the NL government of misstating the terms of the company's interest. See: http://www.cbc.ca/news/canada/newfoundland-

Meanwhile, though the AAC is not expected to be harvested, planning has continued to rely on precisely calculated harvest levels with "other" values treated as constraints and subtracted from AAC totals. There has been no coherent attempt to re-evaluate priorities on the Zone 5 lands. Rather, the full AAC has been allocated in anticipation of demand from the wood products industry.

4. Analysis: problems, opportunities, and steps in the right direction

In their analysis of the historical evolution of forest policy in British Columbia, Hagerman et al. (2010) hypothesized about the dynamics of policy change: 1) policies follow a punctuated equilibrium model, wherein incremental changes occur over long periods, followed by measurable changes marked by new actors, institutions, decision-making processes, and ecological outcomes; but that 2) entrenched, possibly maladaptive policy configurations often persist regardless of evidence of policy failure, or changed forestry objectives. In common with their findings, forest policies and legislation in Newfoundland have changed dramatically in recent years; but practices have not kept pace. While EBM and inclusive, two-way public participation form much of the verbiage of forest policies, actual planning processes have continued to emphasize wood fibre extraction and minimize "other" public values. Where practices have changed, it has often been as a result of changes in markets (e.g. undercutting the AAC) rather than EBM or public input.

This is problematic, particularly because the pace of change across ecosystems is expected to increase with climate change. *Resilience*, "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks" (Walker et al. 2004:1) will be necessary in years to come in order to maintain ecological and social processes (Chapin et al., 2009). Rather than rigidly maintaining status quo, resilience theory notes the need for adaptive management, and recognizing disequilibrium and change as inherent to systems. Management needs to be flexible and adaptive.

Forest management cannot remain static within a dynamic system. However, management persistence has occurred – as described above – through a combination of causes,

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labrador/story/2010/06/24/german-company-wants-nl-paper-mill-624.html; and: http://www.cbc.ca/news/canada/newfoundland-labrador/story/2010/06/28/lott-bankruptcy-abitibi-628.html,

including: difficulties of reconciling diverse land use objectives, a tendency to remain entrenched in the traditional management regime, a lack of capacity and appropriate policy mechanisms, and procedural, rather than substantive or collaborative, public participation. Though this paper has explored many of the problems with implementing EBM, there are also many opportunities.

4.1 Implementing ecosystem-based management

EBM emphasizes adaptability, place-based management, and the reintroduction of ecological processes (Grumbine, 1994), admittedly very difficult concepts to implement. But a number of other jurisdictions have experimented with various forms of ecosystem-based management. By definition, EBM should be tailored for a particular set of circumstances, rather than implemented as a static set of rules; however, there are lessons to be learned from other regions.

The most obvious example is from Labrador. The District 19a Plan was created through an agreement between the Government of Newfoundland and Labrador and the Innu Nation to implement EBM in Labrador on former forest industry-managed lands. The Innu Nation were granted funding to hire people as "Forest Guardians" who then acted as conduits of information and knowledge between the Innu Nation and the Newfoundland and Labrador government (Innes and Moores, 2003). Management goals were identified through joint planning exercises between the government and the Innu Nation, and over 60 percent of the landscape was designated as ecological or cultural reserves and harvesting practices were modified because of the importance of Woodland caribou and other non-timber values. The plan was hailed by ENGOs, who recognized the network of reserves, with AAC as a secondary consideration: "this is the first example we know of in the province that lives up to the commitment in the National Forest Strategy to set harvest levels as an outcome of the planning process" (Sierra Club, 2003, p. 4). In this case, the Innu Nation had a great deal of power because of its government-to-government status in negotiations, but the general model of engagement and collaboration can be a model.

The 1994 Northwest Forest Plan [NWFP] is another example of EBM in practice. The NWFP was created after the listing of the northern spotted owl (*Strix occidentalis caurina*) under the U.S. Endangered Species Act, and resulted in the creation of a regional system of late-succession and riparian reserves and modified forest activity throughout the range of the spotted owl in Washington, Oregon, and California. Adaptive management was incorporated into the

NWFP through Adaptive Management Areas, where innovative management could be conducted and its effects monitored and evaluated (Shindler et al., 1999). The impacts of the NWFP included more late successional/old-growth forest and structural diversity (Moeur et al., 2005), improved watershed conditions (Gallo et al., 2005), some success in species recovery and the generation of valuable scientific knowledge (Molina et al., 2006). However, the NWFP has contributed to job displacement in many timber-dependent communities, and has had mixed results regarding community well-being for most communities in the region of the NWFP (Charnley et al., 2006). Timber production has not been predictable under the NWFP and has declined substantially throughout the region, though mechanization, global market forces, and industry restructuring have also had profound impacts on employment for most communities, complicating attribution of effects (Charnley et al., 2006). Many of the requirements of the NWFP that resulted in decreased timber harvesting caused substantial controversy, and components of the NWFP have been modified over time (Molina et al., 2006).

Newfoundland may, in fact, avoid some of the difficulties of the NWFP because most of the land base outside of municipalities is owned by the Crown. The ownership and cross-boundary issues encountered in NWFP creation and implementation do not exist in Newfoundland. In addition, the forest industry in Newfoundland has already declined, perhaps avoiding the steep harvest drops that accompanied EBM implementation in the northwestern U.S. The following sections provide a few suggestions for EBM implementation.

4.1.1 Managing for heterogeneity

Rather than adhering to the current management system, which focuses almost entirely on the timber available for harvest, forest management could shift to encourage adaptive, experimental management. Experiments could happen, at least initially, in designated adaptive management units, modeled after the NWFP Adaptive Management Areas. One such adaptive management unit could be the Humber Valley, where efforts are already underway to experiment with planning and management under the Humber River Basin Project. Management could take many forms, including: 1) emulating historical disturbance patterns in order to "perpetuate the evolutionary environment and ecosystem functions" of the forest (North and Keeton, 2008), and 2) managing for what is "left behind" after a timber harvest, at several spatial and temporal scales.

Harvest systems based on the regulated forest ideal – mostly clearcutting patches at regularly-spaced intervals – were once thought to sufficiently mimic historical boreal forest structures and processes (McCarthy 2000). But recent work on the island creates a compelling picture for a more variable and heterogeneous silvicultural regime (e.g. Jardon and Doyon, 2003; Thompson et al., 2003).

The findings of Thompson et al. (2003) suggest leaving variably-sized patches or gaps across the landscape. Patches are generally larger-sized and can be the result of "catastrophic" disturbances such as fire or epidemic insect infestations; gaps are smaller-sized and result from single tree deaths, often from root or butt rot (McCarthy 2000). Both types of openings are common across the boreal, providing room for new growth and over time contributing to variability at multiple scales. These openings can be created through various types of uneven-aged management, such as those suggested by Jardon and Doyon (2003). Jardon and Doyon (2003) recommended harvesting some stands (about 30%) in an even-aged (clearcutting) manner, but also using selective harvesting in different combinations to reflect different types of disturbance on the remaining managed lands. This would involve removing some basal area over time, such as creating a half-rotation system, removing half the basal area at a time, or removing small amounts of basal area (20-30%) more frequently.

Additionally, following harvest, DNR-Forestry could leave forest structures that either mimic historical forest structures or provide habitat for selected species. For example, the quality and quantity of leave trees – species, diameter, condition – is important for some wildlife species. Smith et al. (2008) found that post-harvest wildlife trees in western Newfoundland were predominantly small-diameter trees, or hardwood species that were vulnerable to domestic harvesters and windthrow. They recommended longer average rotations, leaving behind more large-diameter trees as snags (10 large snags per ha), snag creation through topping, and minimizing the use of white birch for domestic harvest.

Coarse Woody Debris is another forest structure that provides habitat, often refugia after harvest. Larger CWD, such as large windthrown trees, are likely to provide better habitat for many species than very small CWD. In the words of Sturtevant et al. (1997):

> In Newfoundland… a typical harvest rotation is between 50 and 60 yr, and coincides with the lowest CWD volume on the forest floor. If harvests are repeated over many rotations, we expect that CWD volumes will be reduced significantly… and that available would be limited to residual volumes left over as conifer slash and standing, but declining, birch after the harvest… although

> perhaps sufficient for other purposes, e.g., nutrient cycling, this type of debris is unlikely to provide adequate structure for wildlife. (Sturtevant, 1997, p. 711)

CWD could be managed to provide larger structures through retention of individual older trees, which will eventually fall, or by maintaining some large debris on the forest floor after harvest.

These suggestions are the proverbial tip of the iceberg. Of course, land management techniques could be implemented in an adaptive manner, with clear objectives (e.g. attainment of certain stand structures or habitat types) and long-term monitoring. Processes within five-year plans could 1) establish a set of objectives for particular forests, 2) hypothesize likely outcomes of management decisions, 3) implement different management techniques across the landscape, and 4) revisit those decisions through analysis and comparison of actual forest conditions with original objectives. A similar process was suggested in the 1995 EPR (DNR-Forestry, 1995), which provided a policy structure to undertake adaptive management.

4.1.2 Moving beyond silos

Forest decision-making in Newfoundland often hinges on prioritized forms of knowledge, excluding other types of knowledge. DNR-Forestry decisions are made within a narrow range of forest expertise which includes the creation of the AAC, use of optimization models, and silviculture rooted in the regulated forest ideal. District Managers and staff at DNR-Forestry share similar training and backgrounds, overwhelmingly grounded in traditional forestry; the capacity to implement EBM may therefore be limited. However, this is not to suggest that responsibility lies with the foresters themselves to change a system that recognizes and rewards certain types of expertise. Rather, it may be more appropriate for government to provide leadership regarding how EBM is to be implemented, not only in DNR-Forestry, but across all natural resource management agencies.

Despite overarching problems with the shift toward EBM, there are a number of encouraging efforts that signal institutional change in forestry in Newfoundland, elaborated below.

First, interdisciplinary working groups that are operating within Newfoundland are an exception to the often narrow focus of provincial forestry. These groups have formed around management issues (such as pine marten recovery, measuring cumulative impacts of

management), which may have more easily identifiable goals than the five-year planning teams. They include members of multiple agencies, and often members of industry and other public groups, incorporating multiple forms of expertise. Since 1992, Model Forest of Newfoundland and Labrador has served an intermediary function for many of the groups, "chairing the meetings without being chair" (54, MFNL). These working groups defy the strong tendency within government to maintain agencies within "silos" that function as echo chambers, effectively blocking EBM and planning across sectors. The range of issues that have been explored through these groups, from technical scientific questions to community sustainability, and the inclusion of multiple stakeholders, including ENGOs, industry, and government, indicates their contribution to EBM.[20] However, many of the collaborative group research projects have been curtailed, and their impacts on linking EBM policy objectives with forest management practices have been ambiguous.

Second, voluntary land management certification and agreements have, incrementally, pushed the forest industry in Newfoundland toward EBM. CBPP has attained two forms of certification: ISO-9001 and CSA. CBPP is currently applying for FSC certification, considered the most rigorous certification system. These standards have established guidelines for management, as well as systems for monitoring and evaluating management. Furthermore, Kruger, the parent company of CBPP, is a signatory to the Boreal Forest Agreement [Agreement], a Memorandum of Understanding created in 2010 through a partnership of ENGOs and forest industry. The Agreement provides explicit direction and objectives for ecosystem-based management, including networks of protected areas and harvest deferrals for caribou habitat (BFA, 2010). All of these efforts bypass governmental oversight and, in the process, often exceed its standards.

Third, DNR Forestry has historically incorporated adaptive management projects as part of a broad research strategy that is attempting to revitalize forest industry, contribute to community development, and implement EBM. Moores (2001) cited five research projects that were grounded in adaptive management: 1) the Forest Service growth and yield program; 2) the 5-year multi-partner buffer zone study; 3) the wildlife corridor study in the Northern Peninsula; 4) the pine marten habitat model developed with the Canadian Forest Service and other partners; and 5) the road access study in Labrador, measuring vegetation changes. According to

[20] A full list of project reports is available online: http://www.wnmf.com/compendium.html

interviewees, adaptive management projects have been revitalized, such as through the caribou study currently being developed in Zone 5 (central Newfoundland) measuring caribou response to habitat change. In addition, the DNR Forestry opened an office dedicated to identifying and facilitating research, including EBM-relevant research.[21]

4.1.3 Creating a role for land use planning

If EBM is to work in Newfoundland, there should be clear priorities for Newfoundland's forests, and this cannot be done in the absence of a comprehensive land use planning effort.[22] The activities and environmental impacts of mining, agriculture, oil and gas, municipal development, wildlife, tourism, and parks are all included under the EBM umbrella, and excluding the obligations of these various government agencies places undue burdens on DNR-Forestry and creates unrealistic expectations for citizens involved in forest planning. Other sectors, in fact, may have greater impact on land use planning than the forest industry in the future. Currently, DNR-Forestry removes lands that have operational and administrative constraints from its planning, which means that the agency is only managing harvestable lands, not forests. The lands that are removed from timber harvest could be included in land use planning, with AAC built into the broader planning effort.

The impacts of subsistence and recreational activities by Newfoundlanders are also currently not well integrated into any sort of forest planning aside from case-by-case permission and the designation of domestic wood harvesting areas. In practice, domestic fuelwood usage often occurs outside designated areas and may involve removing trees left as wildlife habitat. Domestic fuelwood harvests, hunting and snaring, fishing, and cabin building are all culturally and economically important, and Newfoundlanders already have strong ties to their forests and extensive experience as informal managers and utilizers. They are already in the woods, and so bringing them into the planning fold under a comprehensive land use plan is one way to account for a great deal of activity already occurring on the landscape.

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[21] This research project is partly funded by the Provincial Forest Service.

[22] Land use planning is mandated under the Urban and Rural Planning Act, but this Act is primarily directed at municipal planning rather than broader land use planning, and it has had little impact on forestry or conservation in the province. The Interdepartment Land Use Committee (ILUC) coordinates some land use planning activities, though it maintains the boundaries between departments and neglects cumulative impacts of land use decisions by consulting on a case-by-case basis. Therefore, comprehensive land use planning is not in place in Newfoundland.

DNR-Forestry is a natural home for land use planning in the province. DNR-Forestry is likely the government agency with the most experience in landscape-level planning, and the agency has significant modeling capacity even for non-timber values, though most is currently focused on planning and allocating AAC. DNR-Forestry is also the most publicly available and responsive agency, and has experience in public stakeholder inclusion and participation. It has experienced pushback from public groups and from other agencies, and has responded, though haltingly, with a number of programs meant to create networks of working groups and joint decision-making. It is a decentralized agency with a presence in many small, isolated communities. These are attributes that can contribute to the creation of a successful land use planning process. In addition, forestry is a natural resource sector that has a number of models of EBM, including the Boreal Forest Agreement and the District 19a 5-year operating plan in Labrador.

Land use planning does not, however, arise spontaneously. It generally requires top-down legislative mandates, as in the case of Oregon's comprehensive land use laws, which stem from a major legislative effort, Oregon State Senate Bill 100, passed in 1973. Senate Bill 100 established institutions to coordinate planning and administer the law as well as to contain urban growth, conserve forest and farm land, and create multi-scale land use plans that have guided growth and development (Steiner, 2008).

4.1.4 Developing rural communities

Because of the many impacts on community well-being through ecosystem-based management (Charnley et al., 2006), and because of the already difficult economic circumstances in rural Newfoundland, community development is central to EBM in Newfoundland. Community development, especially rural development, are often cited as justification for continued governmental support of the status quo forest industry. However, stability of industry should not be conflated with community stability. Government support in forestry, in terms of both subsidies and planning decisions, is focused on maintaining stability and a range of options for industry. This is in apparent conflict with the stability of employment or community development for many rural places in the province. The traditional sawmill and pulp and paper industries will remain an integral part of community well-being and employment, but they are decreasing in relevance as fewer people rely on them for income. Bath (2010) found

a sharp decline in the proportion of people in western and central Newfoundland deriving income from commercial forest activities, from 22% in 2000 to 13.1% in 2006 and less than 7.9% in 2010. Harvesting is now carried out by contractors, who assume the financial risk of acquiring equipment, and employment has steadily declined, not only with mill closures and capacity reductions, but with increasingly lean production since at least 1984, when Kruger purchased CBPP (Norcliffe, 2005).

In the future, small-scale entrepreneurial employment and value-added wood product development may form a larger component of the forest sector. In places like the northern peninsula of Newfoundland, the pulp and paper industry has already exited after a prolonged period of disinvestment. Small businesses can build on relatively small up-front investments and in areas with low levels of human capital. This type of employment will not replace large-scale industry, and it is difficult to compare the two approaches economically; large companies such as Abitibi and CBPP could employ far more people and contributed far more to the province in terms of revenue. But niche and small-business employers, with only a handful of employees, may be more appropriately scaled for rural communities. There is no "boom" that accompanies megaproject employment, but there is also no "bust" in its wake. The switch to small enterprises, therefore, should not be seen as a substitute for large industry development, but as a diversified and nimble approach to both forestry and community development in the absence of industrial investment. Small-scale and entrepreneurial businesses can take many forms, from tourism and outfitting to non-timber forest product harvesting, specialized wood products, and commercialized domestic fuelwood operations.

Long-term leases within the province are still connected with pulp and paper production. In order to link forest activities with community development, new tenure arrangements such as community forestry could be attempted. Regional Economic Development Boards, the Rural Secretariat, the Atlantic Canada Opportunities Agency, the Innovation, Trade and Rural Development agency, and Model Forest Newfoundland and Labrador are all sources of capacity for forest-related community development. Alternative lease lengths, giving commercial operators some security and access to timber and/or non-timber products, could also be created.

DNR-Forestry could also separate the AAC into different species – an effort has already begun to separate the softwood species, but the agency could also include harvestable stands of hardwoods. Many woodworkers use imported wood species that are available locally. But hardwood stands are largely ignored in forest planning, or hardwoods are left as wildlife trees

and then harvested by domestic fuelwood gatherers. A more careful planning effort around hardwood utilization could benefit woodworkers in the province.

4.1.5 Finding a new role for forestry

The [forest] sector is tired. (52, academic)

All of the preceding suggestions imply a fundamental issue: the unclear role of DNR Forestry in a changing environment. Pulp and paper mills and sawmills have closed and DNR Forestry is struggling to fulfill mandates that are not always clear; it may also lack the policy tools, capacity, or direction to implement current forest policies regarding EBM. But the forests of Newfoundland will continue to need some form of management and planning, especially as people will continue to use them for subsistence purposes, and industries – including mining, oil and gas exploration, and tourism – continue to need the forests for their activities.

The provincial government has supported industrial forestry since the first formulations of forest policy when Newfoundland was not yet part of Canada. These early policies were meant to encourage forestry as a form of economic diversification. Industrial investment was a successful policy for some time – particularly during the middle of the 20th century, when the pulp and paper industry was a successful example of policies aimed toward industrial diversification. However, changes to the pulp and paper industry, including a shift in market from North America to Asia, the rapid appreciation of the Canadian dollar, and weak demand in key markets such as the U.S., have eroded the profitability of many firms and call into question the continued focus on industrial viability (Wernerheim and Long, 2011; Milley, 2008; APEC, 2008). The rising economic importance of other sectors, especially oil, gas, and mining, detract from forestry's continued importance (Department of Finance, 2010a). As the forest sector has become a smaller and smaller proportion of provincial GDP and employment, and as environmental expectations have changed, its policy mandates have likewise changed, but without adaptation of practices and necessary tools.

Change may also be halting because there is an organizational momentum to support the status quo, as in the case of the U.S. Forest Service in the 1990s (Hirt, 1999). The creation of the Zone 5 five-year plan underscores this point: without clear industrial demand for wood fibre, DNR Forestry continued status quo planning exercises, allocating wood to phantom companies

for fear of losing control over the landscape. The provincial government primarily looked to replace industrial demand, without input from the public.

An economic overview from Wernerheim and Long (2011) suggests the need to adjust approaches to forest sector support. Abitibi Consolidated is gone and CBPP has been relinquishing lands and decreasing mill capacity, yet the province has continued to pour money into industrial operations, with subsidies totalling over $26 million from 2008-2010 for the continued functioning of CBPP (Auditor General, 2011). These subsidies, which were either for management ($13.3 million) or for the rights to 447,700 ha of land ($12 million), indicate that when faced with imminent change, the province has largely supported an increasingly tenuous industry rather than modify its approach: "everything is going to be done to keep [Kruger] around, which makes it hard to plan" (9, DEC). Rather than anticipating a new role for forests, both economically and socially, government appears to be waiting to respond to the next crisis. This rigidity could lead to collapse of current governmental forestry institutions altogether, then a slow, difficult restructuring period during which new forest management and policy tools must be created.

If the mandate of forestry has changed to EBM, then the new role of DNR-Forestry can involve a number of activities, some of which are already being pursued: 1) adaptive management and research, including research into how unmanaged stands function; 2) land use planning and the coordination of public participation; and 3) rural community development, including the support of entrepreneurial and small-business ventures, continued support for forest industry as it restructures, and research into new industries such as the fledgling wood pellet industry, which shows global market growth (Department of Finance, 2010b).

4.2 Capturing missed opportunities: public participation

The difficulties encountered in Newfoundland in conducting public participation are not unique. Many of the barriers identified in the discussion are similar to those in LaChapelle et al. (2003): lack of agreement on planning goals; inflexibility in processes and concern with procedural obligations over meaningful dialogue; and institutional barriers with unequal power relationships and inability for members of the public to impact decisions. The current models would be considered "unauthentic" by the standards of King et al. (1998). But models and

standards of effective public participation exist, and the province itself has had several successful public participation efforts, and has suggested (but failed to implement) several more.

One missed opportunity was the requirement for annual meetings in the province to reassess forestry outlined in the 2003 Provincial Sustainable Forest Management Strategy. The Strategy called for DNR Forestry to "host an annual Provincial Sustainable Forest Management Forum… This forum will be comprised of provincial stakeholders and will provide advice to the Minister on forestry matters that are provincial in scope" (DNR-Forestry, 2003, p. 67). Such meetings, in the absence of harvest plans and pre-determined agenda items, could give shape to public concerns and subsequent planning efforts.

Another missed opportunity was the public consultation required by Bill 27 for Zone 5 (RSNL 1990 c F-23 §13.1(4)). The successful effort in District 19a may have served as a model for the creation of the Zone 5 five-year operating plan. While the government wanted to manage the land as unalienated Crown land immediately following expropriation (without comprehensive public consultation), this historic land transfer nevertheless marked an opportunity to think through alternatives for forestry in the province, *including* forest industry as one option. With reduced wood fibre demand and the interest of diverse stakeholders, the province had the time and opportunity to do the upfront planning necessary for an inclusive, collaborative planning process. Revisiting forest management goals and objectives requires a great deal of effort, but the business-as-usual approach to public input is not adaptive and does not promote public involvement. Rather, it may contribute to "an end that is described more by the production of a plan than the creation of a new future" (Lachapelle et al., 2003, p. 486).

A third set of missed opportunities were the planning team guidelines provided in the Environmental Preview Report (DNR-Forestry, 1995). These guidelines included a comprehensive public participation process: 1) identification of forest objectives and issues by the public (solicited prior to planning; 2) 2 or 3-day workshops at the start of every 5-year Planning Process; 3) creation of alternate forest forecasts with varying management objectives; 4) draft plan review through a 1-day workshop; 5) continuous evaluation and co-monitoring with various groups; and 6) evaluation of forest conditions and comparison between forest conditions and forest management objectives (DNR-Forestry, 1995, pages 17-18).

Aside from involving the "general public," public participation includes collaborative intergovernmental planning, as various agencies represent the interests of different segments of the population. Margerum (2008) identified types of public participation and interagency

collaboration that occur at different scales and with different participants and objectives. At the local level, decisions are made that are directly relevant to implementing projects and local planning, and tap into community capacity of participants. At another level, government agencies and interest group representatives collaborate to change programs and organizational approaches; at yet another level, government experts, scientists, and policy makers create change through legislation and policy reconfigurations (Margerum, 2008). These multiple levels of participation underline the different roles that are played by the public at large (e.g., direct action) versus policy makers, academics, and perhaps interest group representatives (e.g., policy, budget, and organizational changes). Several examples of interagency collaboration are given above, in section 4.1.1. These collaborative interagency efforts can resolve some issues at the governmental or policy level, but they should be supplemented with authentic, meaningful public participation. The two processes should be complementary, and can occur simultaneously or in stages. For example, in the U.S. Fire Learning Network, different scales are represented by local collaboratives, which involve diverse, open stakeholder meetings to resolve conflicts and implement projects, and regional networks or communities of practice, consisting of groups of experts who pool their knowledge and critique plans to improve their problem-solving capacity (Goldstein and Butler, 2010).

Below are some suggestions for more effective public participation and interagency collaboration.

4.2.1 Incorporating principles of public participation

In public meetings, often a few powerful voices dominate, arguments are framed by polarization and combativeness, and "the broad but shallow interests represented by citizens [are] trumped by the narrow and deep interests represented by organized groups" (Innes and Booher, 2005, p. 421). But public participation processes are often polarized and dominated by a few voices because of the way they are structured. As noted by Innes and Booher (2005), hearings and public meetings lend themselves to ritualized, formal public participation with one-way information, flowing from the planners to the public. Unsurprisingly, many people become frustrated with this approach, deem meetings a waste of time and withdraw from participatory processes. In the "ladder" model of citizen participation, Newfoundland's public participation processes are at the tokenism stages (Arnstein, 1969), whereby the public has some opportunity

to voice concerns and rights and options of the public are identified, but the public voice has very little influence over management and planning.

In response to these problems, Innes and Booher (2005) recommend a method of collaborative participation, based on dialogue, mutual learning, and joint problem solving. This requires that meeting facilitators are trained in conflict resolution. It also requires that citizens be able to present their own data, and question data that is presented (Fischer, 2002). Ansell and Gash (2008) refer to *collaborative governance* as public-private partnerships, in contrast to adversarial governance, which relies on polarized positions and "winner-take-all" outcomes, and managerial governance, in which public agencies have complete control over decision-making. In collaboration, participants work together toward consensus regarding goals and management actions (Wondolleck and Yaffee, 2000).

Working collaboratively can increase capacity, contributing to institutional capital as people form networks to share information and work together, build trust among different actors and between citizens and government, develop an institutional legacy of shared knowledge, and learn to better understand conflicting perspectives (Innes and Connick, 1999; Khakee, 2002). This can lead to more competent, empowered citizenry with better access to resources and – ultimately – the potential for improved community well-being (Chaskin, 2001).

In the collaborative model, members of the public have their interests represented, either individually or through representatives and joint fact-finding and the sharing of knowledge (Innes and Booher, 2005) and government agencies have clear, aligned goals and policies across different sectors (Margerum, 2008). It may require more long-term commitment from participants, along with more opportunities for general public dialogue and reflection on forestry in the province. For their CSA certification, CBPP established a Public Advisory Committee that has met regularly since 2003. This advisory board model may be one approach to collaboration.

While standards can be established for participation – inclusiveness, collaboration, consensus-based decision-making, joint problem solving – participatory models cannot be formulaic because of the need for flexibility according to the issue being addressed. But standards can be created for effective public participation, and these standards generally include fair representation, clear goals and objectives, two-way information and interaction, access to information, and ability to influence planning (Rowe and Frewer, 2004). Public participation can be conceived as a continuum of activities, from providing initial information (position papers, newsletters, website, mail-outs) to more involved activities that allow more authentic public

participation, such as round tables, focus groups, referenda, and tasks forces or public advisory committees (Beckley et al., 2007). As an example, the Applegate Partnership in southern Oregon involved industry, government, and citizen group and resulted in a long-standing watershed council, and restoration and research projects, outreach, and improved relationships among participants (Rolle, 2002). This partnership involved a hands-on approach, with participants often engaged in the field and confronted with real-world restoration and concrete examples of management.

Who will implement these multiple forms of public participation? Currently, DNR-Forestry managers bear responsibility for almost all public input processes; but these obligations should be shared among other agencies, community developers, ENGOs, and academics.

4.2.2 Bringing the public in early

The public is often brought in to participate *after* the creation of plans, and so their input is inevitably reactionary. Research indicates that "if people are consulted before the preparation of a new project their opinion is more likely to be incorporated than if they are asked to comment on an already identified and designed project" (Buchy and Hoverman, 2000, p. 17).

Again, the province has a model already in place. During the creation of the District 19a five-year operating plan in Labrador, public values were identified prior to planning, and the results of scientific modeling and assessment were analyzed and discussed by stakeholder groups through an iterative process (Sturtevant et al., 2007).

But the public should not only be brought in early: processes should be developed that are continuous, so that participants can watch the progression from goal setting and clarification of objectives through action and evaluation (Shindler et al., 1999). This facilitates adaptive management, or learning through doing, as knowledge is created amongst participants and problem-solving occurs through joint exercises. This can also be a means of identifying research gaps and sharing information and expertise to better inform decision-making. The Public Advisory Groups and Planning Groups suggested in the Environmental Preview Report (DNR-Forestry, 1995) and the current Public Advisory Council maintained by CBPP are examples of continuous processes that allow the public to formulate objectives, oversee management, evaluate progress toward implementing objectives, and adjust management based on forest conditions and social and economic circumstances.

4.2.3 Creating an open forum

The uncertainty of the current forest decision-making environment also provides a window of opportunity for more open forums of public participation. One way to provide a more open forum is through deliberation, a central aspect of public participation, "where participants are provided with information about the issue being considered, encouraged to discuss and challenge the information and consider each other's views before making a final decision or recommendation for action" (Abelson et al., 2003, p. 242). This suggests more focus groups, more exercises in valuation and more open question and answer sessions wherein people can bring up their values regardless of the restraints imposed on harvesting. But it can also force the public to acknowledge those harvesting restraints, and to become aware of the effects of restrictions on forest industry viability.

A more open forum will not necessarily benefit one stakeholder group over another. While government may feel some of its control over resources diminished, environmental groups also tend to distrust collaborative governance (McCloskey, 1999). Collaborative governance and EBM goals are not necessarily compatible, as (for example) some stakeholders may demand more access to cabins through road building and maintenance.

4.3 Future policy-relevant research

The many challenges and opportunities facing forestry have been outlined above. Accompanying these, there are many opportunities for research projects that contribute to EBM and public participation. I focus on social science-specific research below, as several of the previous sections touched on biophysical research.

First, there is great uncertainty surrounding non-timber values, both how to measure them and how to manage for them. Capturing these values economically is not easy; two useful economic methods are hedonic pricing, which creates proxies and estimates for diverse goods bundled into heterogeneous commodities such as "sustainable forestry," and contingent valuation, which creates a hypothetical market in order to assess non-market goods. But these approaches neglect the interactive, two-way dialogue that actually informs management and planning, and can build social capital and create greater public buy-in. One research approach to this is the meta-model approach developed in Labrador District 19a (Sturtevant et al., 2007),

wherein experts can be assembled from a wide range of fields to incorporate many existing models into a multi-scalar planning effort. As model results are collected and interpreted, simplified analyses can be presented to stakeholder groups, who then indicate how their values are being captured or not (Sturtevant et al., 2007). The actual creation of the models is a scientific endeavour, but social scientists are needed to conduct focus groups and meetings to assess perspectives on the proposed scenarios.

Annual meetings and public forums are an opportunity for social science researchers to gain in-depth information about public perceptions of forest management and whether participation methods are effective. To test their effectiveness, standards of collaborative governance can be used, for example by asking (following Ansell and Gash, 2008): Was consensus achieved, or at least attempted? Were mutual gains and common objectives identified and pursued? Were people satisfied with the process? Was negotiation conducted in good faith? Was knowledge shared, and did ownership over the process extend to all stakeholders?

Carefully designed quantitative values surveys can clarify how people's values change over time and place, and by demographic. Because a broader proportion of the population can be sampled, government and other stakeholders can assess participant representativeness, and also reasons that people do or do not participate. They can therefore determine whether their decisions reflect the concerns of the public.

Research is also needed into how people conceive of economic opportunity and utilization of the forests, and the varying levels of regional or local community capacity, which is the ability of communities to manage forests and to capture the benefits of forest management. Through case studies, social scientists can begin the task of identifying where economic opportunities exist, and how different communities can be supported in developing different forest sectors, for example bioenergy, sawmills, tourism, non-timber forest products, or value-added wood products.

Finally, researchers and residents in Newfoundland have identified the cultural and economic importance of subsistence forest activities, especially fuelwood harvesting and hunting (den Otter and Beckley, 2002). The continued importance of a subsistence economy in Newfoundland is considered rare in the first world, and its implications could be important for forest policy and governance (Emery and Pierce, 2005). There is also a growing body of literature about the informal and formal arrangements and norms followed by members of the commons in order to govern resource use (e.g. Dietz et al., 2003; Ostrom et al., 2002). How do

these arrangements function in Newfoundland, and how could subsistence users of the forest be incorporated into more formal forest and land use planning? Beyond the importance of these activities to individual Newfoundlanders, how do these activities relate to ecosystem-based management? How can entitlement to and dependence upon the forests translate to participation in forest decision-making? How can the people of Newfoundland, who already use their forests and know them, contribute to better forest policy and management? How can their skills, knowledge, and needs contribute to the future of forestry in this province?

This document is meant as a starting point for policy discussions and I recognize that the government has already made promising decisions to address some of the identified shortcomings. Building upon these successes requires policy tools that bridge the gap between stated objectives and current practices. It also requires giving agencies, including DNR-Forestry, the capacity and the flexibility to move beyond the status quo. The downturn in the forest industry is not likely cyclical. To borrow a metaphor from ecology, we have surpassed a threshold and are looking at a new state, a new set of circumstances and parameters for management. Without pulp and paper, forestry in Newfoundland needs clear direction, and the tools to get there.

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Appendix 1.

Assigned number[a]	Position relevant to research project	Included interview?[b]
1	DNR-Forestry	
2	ENGO	Y
3	DEC-Wildlife	Y
4	WERAC	Y
5	Innovation, Business, Rural Development	Y
6	Academic	
7	Academic	
8	DEC-Environmental Assessment	
9	DEC-Environmental Assessment	Y
10	ENGO	Y
11	Academic	
12	Rural Secretariat	Y
13	ENGO	Y
14	Academic	
15	DNR-Forestry	Y
16	DNR-Forestry	Y
17	ENGO	Y
18	Natural Resources Canada	
19	DNR-Forestry	Y
20	Academic	Y
21	DEC-wildlife	Y
22	NR Can	Y
23	DNR-Forestry	Y
24	DEC-Wildlife	Y
25	DNR-Forestry	
26	Logging contractor	Y
27	Forest industry	Y
28	Outfitter	Y
29	Outfitter	Y
30	ENGO	Y
31	Forest industry	Y
32	Forest industry	Y
33	Outfitter	Y
34	Logging contractor	Y
35	Businessman (non-forestry)	Y
36	Community leader	Y
37	Community leader	Y
38	Logging contractor	Y
39	Economic development	Y
40	Economic development	Y
41	Economic development	Y
42	Economic development	Y

43	Logging contractor	Y
44	Logging contractor	Y
45	Outfitter	Y
46	Historian	Y
47	DEC-wildlife	Y
48	DNR-Forestry	
49	DNR-Forestry	
50	DNR-Forestry	
51	Dept. of Tourism, Culture, and Recreation	
52	Academic	
53	Parks and Natural Areas	Y
54	Parks and Natural Areas	Y
55	DNR-Forestry	Y
56	DNR-Forestry	
57	Forestry non-profit	
58	Forestry non-profit	
59	NR Can	
60	NR Can	
61	DNR-Forestry	
62	DNR-Forestry	
63	DNR-Forestry	
64	NR Can	
65	NR Can	
66	NR Can	
67	Academic	
68	Academic	
69	Community leader	
70	Academic	
71	Academic	
72	Rural Secretariat	
73	Academic	
74	Forest industry	
75	Economic development	
76	Forestry contractor	
77	Forest industry	
78	Forest industry	
79	Academic	
80	Academic	
81	Academic	

[a] Numbers were assigned haphazardly, in order of data analysis. Each assigned number is an individual. Many individuals were contacted multiple times.

[b] Though all interviews were semi-structured or unstructured, *interviews* were more formal, tended to be focused solely on the research project, and were frequently recorded. *Meetings* were informal and often occurred multiple times with the same participant; some meetings involved multiple participants. All were coded for content relative to the project. **Many participants were involved in both interviews and meetings, and so "included interviews" is used**; total formal interviews = 42. Many interviewees also attended meetings that were later coded, but their identification remained the initial code.