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## CAN STRATEGIC ECOSYSTEM MANAGEMENT SUCCEED IN MULTIAGENCY ENVIRONMENTS?

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**Abstract.** While the descriptive and conceptual literature on ecosystem management is, in general, enthusiastic about its potential advantages, there is now a more critical literature that suggests that the long-term gains from ecological management approaches remain uncertain, in a multiagency context. Moreover, relatively little is known about the long-term influences of economic, political, environmental, and organizational change on both the capacity to implement ecological management systems and their ability to deliver sustainable ecosystem benefits. In this paper, an attempt is made to understand how the “character” of stakeholder agencies (i.e., the sets of interagency relationships and what is termed the organizational ecology of interacting agencies) operate to further or frustrate efforts to introduce sustainable ecological management systems. It does so recognizing that all are subject to change, given the dynamics of the political economy in which they operate. The workings of the Forest Improvement Act (1965–1986) and seven subsequent forest conservation initiatives in Nova Scotia are assessed. It is concluded that, in these Nova Scotian examples, market distortions and inertia within the multiagency political economy are too powerful and pervasive to allow the successful implementation of ecosystem management over the longer term. It is further argued that ecosystem management needs to be reconceptualized from an approach driven by scientific understanding to one that takes account of the multiple sets of interests and values in the political economy as a whole. When management has to involve numerous stakeholder groups, agreement over sustainable practices will not simply arise from the presentation of scientific evidence, but requires a shift in incentive structures from production to conservation.

**Key words:** *ecosystem management; environmental policy; forest conservation; forestry; governance; landscape scale; multiagency ecological management; public policy; strategic planning; sustainable development.*

### INTRODUCTION

Support for the ecosystem management concept has grown during recent decades. Successful partnerships have expedited the achievement of conservation goals in a number of cases, including the Whytecliff Park marine protected area in British Columbia, Canada (Kelsey et al. 1995); the Nantahala National Forest, South Carolina, USA (Meyer and Swank 1996); and Pukaskwa National Park, Ontario, Canada; (Promaine 1998). However, success in ecosystem management is most common in situations where a single agency holds effective sovereign power, as with the Great Barrier Reef Marine Park, Australia (Ottesen and Kenchington 1995, Christensen 1996). The governing agency's established sovereignty in effect controls “partner” interests; and, indeed, when analyzing organizational processes, the so-called partners are treated as externalities by the sovereign power to be “reeled” in as compliant agents.

With more complex organizational structures, a hub and wheel relationship can exist with ecosystem partners. Here, the central resource management agency may hold notional legislative authority, but lack the necessary fiscal and management resources to autonomously implement an ecosystem management plan. One notable example is the national parks system of England and Wales. Working as an enabler rather than with strong statutory power, each national park authority must persuade, negotiate, and bargain with such land managers as farmers, municipalities, and estate managers to advance ecosystem objectives (see Bissix and Bissix 1995).

Even more conceptual and practical complexity is introduced when management involves a network of largely autonomous agencies and organizations in a “working landscape.” Although such a landscape may include a protected area, the land is managed predominantly for its economic resource output (e.g., farming, forestry, mineral extraction), and it will also serve as the location for industrial development and human settlement. Government agencies have minimal command and control powers through which they can progress biophysical objectives, and ecosystem managers must continually work among a myriad of agencies with dis-

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FIG. 1. Location of Nova Scotia in Canada.

similar capacities and motivations to advance ecosystem goals. Campbell and Kittredge (1996:25) argue that under these organizational conditions, ecosystem management “cannot depend on all landowners cooperating fully to create integrated desired future conditions across the landscape. The whims of human nature, a diversity of attitudes, and the independent spirit of landowners virtually guarantee less than 100 percent voluntary participation. And a regulatory approach is unlikely to succeed due to high implementation costs and the complicating factor of landowner rights.” Any statutory authority in this situation must work within a loose policy framework with weak enforcement tools within a regulatory space occupied by many actors.

It is now widely accepted that decisions about the environment are framed by differing conceptions of the problems and that there are challenges to established forms of “expert” knowledge reflecting wider cultural developments in society at large. Conservation/ecosystem management need to be reconceptualized from being a process driven by scientific understanding to one that takes account of the multiple sets of interests and values in the political economy, as a whole (see Policansky 1998). The need for such a conceptual change is particularly evident where policy implementation involves numerous organizations acting essentially independently from each other. Examples of approaches that take into account these multiple interests do exist; Krueger (1994), for instance, describes a Coordinated Resource Management process in Oregon, USA, that has existed for >40 yr. However, even in

such cases, the long-term gains in ecological management terms remain uncertain. Relatively little documentary evidence exists on what can be termed the dynamics of ecosystem management, on the way that management outcomes are affected over the long term by political, social, and economic changes, and by the resultant change in the individual and collective decision-making behaviors of management agencies. This paper attempts to address this gap in the literature by examining whether strategic, multi-interest, multiagency management regimes can effectively guide working ecosystems toward greater sustainability over an extended period, i.e., a time period meaningful for restoration ecology. This paper also asks what management strategies are necessary for success over the long term, and what might be the role of natural scientists in this process? To explore how organizational and political power affects multiagency ecosystem management over an extended timeframe, we examine the lessons that can be drawn from the policy workings of Nova Scotia’s Forest Improvement Act (FIA) 1965–1986. Before considering the methodology and theoretical framework for this study, it is necessary to briefly put this case in context by outlining the conservation problem and the development of conservation policy.

#### NOVA SCOTIA’S GEOGRAPHY AND FOREST CONSERVATION POLICY DEVELOPMENT

Nova Scotia is a 55 491-km<sup>2</sup> peninsula ecosystem jutting into the North Atlantic (Fig. 1). It is the meeting place of the boreal softwoods from the north and the

temperate forests of the south, and represents a transitional belt of hardwoods (such as maple, ash, and beech) and softwoods (such as pine, fir, and spruce). While the climax forest is often a mixed forest, the Labrador Current, the Gulf Stream, and elevation generally dictate forest type, while species mix and age structure tend to be determined by soils, disease, and local conditions. In the Cape Breton Highlands, for example, successive fir monocultures have been ravaged by the spruce budworm and replaced by yellow birch.

Over the centuries, Nova Scotia's forest resources have been exploited to support settlement and wood product exports. However, even today, ~75% of the land area is forested. Whereas in the 17th century it was largely a primeval forest (Johnson 1986), by 1958 a provincial inventory of forest resources concluded that the forests were heavily exploited and that strong conservation measures were needed to sustain both the provincial forest ecosystem and the forest industry (Hawboldt and Bulmer 1958). There are three major land ownership groups that control the bulk of the province's forest resources. The province (Crown) holds 24% of the land, and ~2000 large private or industrial concerns control a further 21% (holdings of >400 ha). The largest proportion of the forested land is, however, in the hands of ~30 000 small private owners, which have ~50 000 tracts of land in holdings of <400 ha. The remaining 3% of the land is held by the federal government (Wellstead and Brown 1994). The preponderance of private forest ownership is atypical in Canada. As these various ownership tracts are scattered irregularly throughout Nova Scotia, all forest ecosystems in the region involve complex multiagency management problems at the landscape scale.

Forty percent of the forest cover is softwood (2.2 Mha), 23% mixedwood (1.2 Mha), and 12% (0.7 Mha) hardwood. Although sensitive to market cycles, forest fiber exploitation has increased considerably since the Second World War. However, the forests' age structure presents a major problem for the sustainability of the wood products industry. In the early 1980s, 41% of the forests were in the mature (>60 yr.) to so-called "overmature" stage, and an additional 35% was destined to enter maturity before 2003. If this mature and overmature stock is harvested using conventional methods in the near future, few forest resources will be available to sustain the industry over time. In addition to industrial pressure, forest stocks are also susceptible to various natural risks, most notably spruce budworm infestations and blowdowns. Significantly, two species, balsam fir and white spruce, which are particularly vulnerable to such risks (Henley 1983), account for >71% of standing softwood volume in eastern Nova Scotia and 90% in Victoria and Inverness Counties on Cape Breton Island.

Natural resource exploitation has had a profound impact on the biophysical landscape in Nova Scotia. On

the Mainland, for example, the forests are heavily fragmented; in the eastern Mainland, where Stora and Kimberly-Clark (formerly Scott Paper) operate pulp mills, the forests are heavily exploited and have undergone extensive forest type conversion. It is now difficult to find 20 ha of continuous forest type anywhere on the Mainland (Mullaly 1995). Since 1989, harvesting regulations governing Crown lands have been in existence, and these have ostensibly been adopted voluntarily by the largest commercial operators as harvesting codes on their own freehold forests. These regulations require wildlife corridors measuring 50 m in width to be left between clear cuts, restrict new cuts in areas where regeneration on adjacent sites has not reached heights of 2 m, and specify the inclusion of streamside corridors and other wildlife habitat considerations in harvesting plans (Compendium 1993:88). Despite such regulations and voluntary harvesting codes, clear-cutting, with all its implications for forest biodiversity and regeneration, still dominates forest management; "fellerbunchers" (large harvesting machines) still cut large swaths through the forests, leaving few trees standing in their wake (Suzuki 1993). Forest exploitation is presently well above sustainable levels, according to the government's own recent policy paper (Nova Scotia Department of Natural Resources 1997, Maich 1999a, b).

Throughout Nova Scotia's forestry history, there has been a major disjuncture between the rhetoric of conservation policy and ground level management practices. Over the years, forest conservation objectives have increased in scope and complexity, but at no time have workable implementation strategies been developed before even more ambitious legislative goals have been introduced. Following rampant cutting during the Second World War, the 1946 Small Tree Act (STA) imposed a minimum-girth harvest requirement as a conservation measure. However, according to the Act's critics, it also served to conserve stunted, poor-quality forests and importantly was also seen to hinder industrial expansion (Creighton 1988). The FIA (Forest Improvement Act), passed in 1965, continued the regulatory approach, but it represented a conceptual leap from previous policies in that it recognized landscape and cultural variation and required devolution of ground-level policy making to multiagency, multi-interest forest management boards. In 1986, the introduction of the Forest Enhancement Act (FEA) signaled a further step away from a uniform command and control approach to forest conservation by imposing few, if any, regulations over ground-level forest practices. The FEA specified watchdog roles for a provincial committee and commissioner, but these were never implemented. Although the regulatory vacuum created by the FEA spawned several forest conservation policy experiments in the 1990s, none to date has endured the test of time. These experiments included "Landscape and Ecology Management" (Wildlife Habitat Canada

1993), "Model Forests" (Hruszowy 1992), integrated resource management (Nova Scotia Department of Natural Resources 1996), greater ecosystem management (Bridgland and Marineau), and forest standards certification (Elliott 1997). Proposals were also made to adopt green taxes, so introducing a form of economic regulation in place of command and control. The failure of these experiments and proposals can be traced, in large measure, to the same fundamental problems that beset the FIA and which are explored in this paper.

Broadly speaking, at the policy level, forest conservation strategies have evolved in response to changes in social demands, technology, and scientific understanding. The conceptual underpinnings of forest conservation have thus matured from rather simplistic attempts to earmark specific trees, towards integrative ecosystem management approaches that seek to reconcile the multiple interests in a shared resource. However, considerable theoretical and practical challenges to integrated ecosystem management continue to be posed by the forestry industry's quest for biological conformity and economic efficiency. Industry requirements increasingly tend toward less mature forests and more simplified plantations to sustain the production of pulp and wood products. Given these requirements, the question must be posed whether ecosystem management approaches can succeed in a working landscape.

#### METHODOLOGY AND THEORETICAL FRAMEWORK

In this study, a broad array of evidence from the private and public sectors was examined, including agency publications and records, legislative assembly records, newspaper accounts, and federal and provincial legislation. The documentary evidence was integrated with analysis of >60 semistructured interviews, conducted with key forest sector actors, and an evaluation of seven contemporary case studies, including two investigated as a participant observer. Amongst the individuals interviewed were the past and present ministers, deputy ministers, and senior and middle managers of the Nova Scotia Department of Lands and Forests (now Natural Resources [NSDNR]), federal forestry officials, and quasigovernmental officers, including the 1984 chair of the Nova Scotia Royal Commission of Inquiry into Forestry, senior managers from the woodlands division of multinational pulp companies, sawmill owners, woodland owners and operators, members of various forest practices improvement boards, recreation and parks managers, and other amenity interests.

Can enduring normative frameworks for strategic, multiagency ecosystem decision-making be developed? Opinions are divided over this key question. On the one hand, much of the public-policy literature is pessimistic about multiagency cooperation over the long term (see, for example, Bozeman and Straussman [1991]). It is suggested that there is little perceived

need for joint goal-oriented action and that the will to cooperate is typically weak; moreover, even when perceived need and will are present, the capacity to successfully implement actions to achieve shared goals is often lacking. On the other hand, a report by the Ecological Society of America was enthusiastic about the promise of ecosystem management to deliver sustainability (Christensen 1996) and provided numerous examples from marine, lake, river, and terrestrial ecosystem management (e.g., Brown and Marshall 1996, Heissenbuttel 1996). However, it was made clear that the promise of ecosystem management would only be realized if sustainable goals and objectives are set, measures are introduced to reconcile both spatial and temporal management scales, and that the management systems are both adaptable and accountable. Although examples of successful implementation can be cited, it remains the case that generalizable, acceptable, and adaptable models for multiagency, strategic ecosystem management capable of enduring over the long term remain elusive.

We define *strategic multiagency ecosystem management* in the following manner: "A management system involving a multitude and diversity of agencies, organizations and interests, interacting in a defined landscape where land use and natural resource managers, as well as users, have a commonwealth of interests and impacts. As a consequence, they coordinate their varying motivation for and capacity to implement a communally valued land use vision within the landscape for their mutual benefit." Whereas an ecosystem is typically defined as a watershed or other prominent physiographic feature, in this study ecosystem boundaries will also be delimited in administrative terms, recognizing the jurisdictions of district and provincial boards.

As outlined earlier, there are varying typologies of multiagency decision making. The most complex, which is the central focus of this paper, includes a government resource agency *acting among* rather than *directing* a milieu of agencies, organizations, and interests. While Nozick considers the mechanisms governing multiagency processes to be largely indefinable—he reduces analysis to an "invisible hand" (Weale 1992:39)—such views are hardly helpful to policy makers and practitioners charged with improving management systems to ensure sustainable development of the resource base. It is argued here that management improvements can be suggested by subjecting the multiagency milieu to closer inspection using three analytical lenses. First, there is a need to understand the *character* of each of the stakeholder agencies; each agency will have its own organizational baggage, resource management goals, standard operating procedures, value systems, professional competencies, and environmental management capacity. Second, the milieu can be analyzed as sets of *interagency relationships*, with each interagency association *de facto* redefining, reshaping, and indeed often skewing eco-

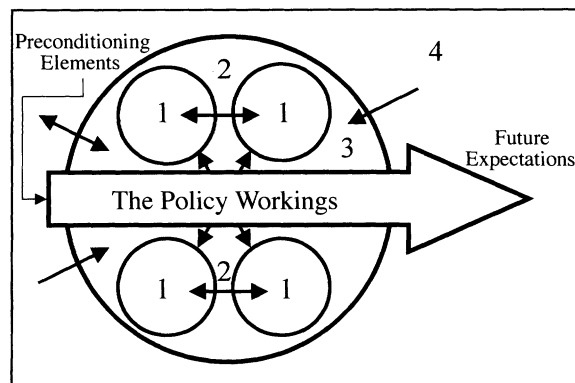


FIG. 2. The multiagency decision-making environment. (1) agency character, (2) interagency relationships, (3) multiagency ecology, and (4) macro political environment.

system management goals, processes, and capacities. Third, it can be seen as a complex play of interacting agencies analogous to an intricate natural *ecology*. As natural scientists appreciate, it is difficult (if not impossible) to identify or predict many of the virtually limitless combinations of relationships, tempering effects, and outputs of an ecosystem. It is nevertheless possible to describe some of the emergent features of an ecosystem that define its productive capacity as well as its vulnerability to changing conditions. Agency character, sets of interagency relationships, and the overall organizational ecology are all subject to change, and it is necessary to view them in the context of a dynamic political economy that includes macro dimensions of power emanating from the public interest, the state, and the market, which in this case is clearly international (Fig. 2).

#### THE NOVA SCOTIA FOREST IMPROVEMENT ACT

According to the preamble of the 1965 Forest Improvement Act (FIA; Forest Improvement Act 1965), its explicit purpose was "to provide continuous and increasing supplies of forest products thereby maintaining industries and providing continued employment; conserve water and prevent or reduce floods; and improve conditions for wildlife, recreation and scenic values."

Ostensibly the 1965 legislative provisions were designed to monitor and control harvesting operations as well as to stimulate reforestation on private lands. One of its initial and most innovative features was the provision creating district forest practices improvement boards (DFPIB) to guide local implementation. Initially, these local boards were conceived of as multi-interest vehicles to build trust, cut red tape, and apply scientific conservation principles at a landscape-sensitive scale. Each board was to include forest industry and local community representatives, and it was to be assisted by a Department of Lands and Forests (DLF) professional forester. Their specific mandate was as

follows (Sandberg 1988:185): [W]ork closely, and in cooperation with local representatives of the Department of Lands and Forests: to do everything to encourage better forest management practices through education, persuasion and the enforcement of the FIA; to prepare and distribute a manual of good forest practice to local woodlot owners; to distribute to operators and buyers the forms prescribed for making reports and returns; and to prescribe, advise, and make recommendations concerning cutting practices and reforestation procedures."

Section nine of the FIA, however, provided the major conceptual challenge. This called for forest practice regulations to be based upon a "satisfactory criterion" drawn from scientific studies to guide judgments on forest maturity (Forest Improvement Act 1965: Section 9[3]). Since the FIA implied that only mature forests could be harvested, determination of forest maturity was critical to the implementation of a conservation agenda; the agreed definition of maturity would effectively determine how much standing stock was available for harvest and how much was de facto conserved. Although seemingly straightforward, this provision drove a major wedge between actors within the forestry sector; it created such serious problems that eventually it contributed to the FIA's downfall (see Bissix and Sandberg 1992).

It must be noted that explanations of the true rationale for the enactment of the FIA vary. On the one hand, Bissix and Sandberg (1992) argue that its true purpose was to remove the girth limitations imposed by the Small Tree Act (STA), which stood in the way of pulp industry expansion; this view was endorsed by one industry leader (D. Eldridge, *unpublished manuscript*), who admitted that the industry needed to cut small trees. On the other hand, a former Lands and Forest minister, when interviewed several years after passage of the FIA, suggested that the Act was introduced to appease environmentalists, rather than to actually promote forest ecosystem conservation (D. L. G. Henley, *personal communication* [1987]). The District Forest Practices Improvement Boards were explicitly designed to resolve forest management issues of local significance and to develop forest practice guidelines that were sensitive to landscape variations as well as to industrial needs. Based on biophysical criteria, the adoption of the DFPIB process made good sense; it was well understood that the diversity of problems encountered over the province could not be addressed by a uniform set of forest practices. For example, whereas in Cape Breton the key issues related to expansive natural monocultures and their vulnerability to endemic disease, in the Eastern Mainland the focus was on replanting, while in Western Nova Scotia the primary concern was about the thinning of new stands. Despite good intentions and some progress made at the local level to formulate forest practice proposals, the DFPIB process languished in the face of the dominating re-

quirement of the multinational companies for uniformity of practice across district boundaries. In view of the production efficiency imperatives claimed by the multinationals, DLF support for local practice determination became equivocal.

The FIA gave the DFPIBs the politically charged task of agreeing on a definition of forest maturity, largely because senior DLF managers had been unable to agree on a definition. However, the same senior DLF officials, who were responsible for ensuring that satisfactory scientific criteria were employed to determine maturity, failed to support the proposals emerging from the nine established DFPIBs. Barely three years after the enactment of the FIA, a legislative amendment (Statutes of Nova Scotia 1968:C114) effectively stripped the DFPIBs of the power to establish local forest practices regulations. A new clause established a Provincial Forest Practices Improvement Board (PFPIB), which was given the primary mandate to settle the forest maturity issue at the provincial level. Once provincially determined maturity criteria had been established, the district boards would subsequently adapt regulations to suit local landscape, political, and industrial conditions, and would later proceed to implementation. Not surprisingly, there are numerous scientifically defensible definitions of forest maturity, depending on the forest attributes or values that different interest groups are seeking to conserve. These could include, for example, industrially useful species, biomass production, economic value, social utility, or natural history. Unfortunately, conservation advocates were slow to recognize that selecting a single acceptable definition was necessarily a political process, rather than one largely driven by biophysical science. Protracted debate ensued, but the maturity issue was never resolved over the 20-yr life of the FIA. This clearly advantaged the multinationals who could continue clear-cutting with impunity, as long as no definitive forest practices decision was made.

What is effective in promoting forest quality over the long term is not necessarily conducive to supporting a forest industry in the short term. The creation of forests practices improvement boards under the FIA marked acceptance of the principle that ecosystem-sensitive resource planning and the long-term sustainability of the forest industry could be progressed through stakeholder involvement within a multiagency management regime. However, after more than two decades of organizational squabbling, in 1986 the Nova Scotia government finally and unceremoniously ended their experiment in multiagency, ecosystem-based strategic planning. While few would claim that the lessons learned were worth the turmoil, the failure of the FIA tells us much about the way various interests exert power and influence in a multiagency ecosystem management system—often to the detriment of explicit conservation and ecosystem management goals.

#### DIMENSIONS OF MULTIAGENCY POWER

Despite its uncertain legacy, the Forest Improvement Act (FIA) represents a protracted effort to apply forest conservation principles in a political economy dominated by land tenure complexity, distorted markets, and uneven power. The FIA's history is particularly significant, because its conservation goals, although quite complex, are technically much simpler than present-day integrated ecosystem management goals. In addition, it clearly highlights the difficult challenges involved in forging any lasting consensus between ecosystem management agents with very different ideological positions. In assessing why this and other multiagency management systems failed, we need to understand how power relationships distort ecosystem goals and how goals shift over time in response to changing internal agency conditions, interagency relationships, ecosystem transformations, and swings in macro-political economic influences.

Although much can be learned by evaluating agency behavior and interrelations, it has to be stressed that a fuller understanding of the policy dynamics can only be achieved by considering the broader political economy within which the forestry sector operates. It is necessary to appreciate the extent to which provincial, national, and international politics and economics can influence ground-level forest fiber production. During the early years of the FIA, for example, the provincial government was faced with crises in the coal industry and with the increasing cost of subsidizing a faltering steel industry. In this context, and given an increasing worldwide demand for pulp and paper, it is easy to see why the province regarded the forestry sector as the only viable alternative for industrial expansion. Inevitably, development pressures continually worked against the conservation efforts proposed by the various forest improvement boards. Such development pressures served to reinforce the suggestion that the boards were maintained in existence largely to placate the environmentalists, rather than to accommodate their requirements as key stakeholders in the forest ecosystem.

The actions and motivations of key agencies—what they do as opposed to what they say they intend to do—are central to understanding responses to ecosystem management initiatives. Although agencies can transform, past practice is a more reliable indicator of future behavior than are untested words and promises. In the FIA management context, the key institutions and actors were highly unequal in their power and capacity. Small woodlot owners, who notionally controlled 50% of the forested area, valued management independence and distrusted government intervention. However, they also lacked managerial sophistication, had weak political bargaining power, and were economically dominated by the pulp processing monopolists and the partially vertically integrated sawmills.

In the face of increasing market domination by the pulp sector, the woodlot owners attempted to organize collectively, but were undermined either by internal dissension or by resolute multinational power (Clancy 1992, Bissix 1999).

For many years, sawmill operators, who could use their own wood fiber supplies for market leverage, benefited from the marketing ineptness of woodlot owners. Initially, they were well positioned to influence policy through the Nova Scotia Forest Products Association (NSFPA) (Clancy 1992); however, the shift to pulp production undermined this privileged access (Deakin 1965). In the immediate post-World War II period, the sawmillers used their market power to dominate ground-level forest practices and encourage high grading (taking the best and leaving the rest). However, during the 1950s and 1960s, the multinational pulp processors assumed an increasingly dominant position; and, as extensive clear-cutting threatened the future supply of roundwood to the sawmills, sawmillers came out in favor of new forest conservation legislation. Although more stringent conservation regulation would be costly to the sawmillers, the advantages in terms of controlling the activities of the pulp processors were seen to outweigh the costs. When the district forest practices improvement boards (DFPIB) were first introduced, they were supported by the sawmillers. However, as the boards became increasingly dominated by the pulp agenda and little progress was made in establishing workable forest conservation regulations, so frustration and disillusionment set in (Bissix 1999).

Initially the three major multinationals involved in pulp production rarely shared a consistent forestry policy agenda. Whereas Scott favored minimal state intervention in forest management and Bowaters resisted pulp mill subsidies for its provincial competitors, Stora originally encouraged greater state intervention to stimulate wood fiber production by suggesting the forest improvement board structure (J. Weslien, *unpublished manuscript*). Similarly, the DLF was not internally unified; it contained significant conflicts of interest and its broad legislative mandate dictated three incompatible goals (Creighton 1988). First, as Crown lands manager, it sought revenue through the sale or licensing of land holdings and stumpage; such sales plus various taxes, fees, and Crown royalties ensured that forestry made an important contribution to provincial coffers. Second, DLF was also accountable for the "responsible" management of private lands; and third, it had a, albeit less extensive, role in recreation, wildlife, and aesthetics management. However, it was clear that the dominant concern driving DLF decision making was industrial development, rather than forest conservation. Over the life of the FIA, the DLF underwent what Bissix and Sandberg (1992:182, note 78) have termed a "pulp culturization" process. Although genuine attempts were made to affect forest conservation policy within the forest improvement boards'

process, it was the overriding imperative for production as articulated by both DLF and the pulp industries that undermined attempts to manage local ecosystems.

The pressure from production interests was exerted through a wide range of interagency and ground-level influences, rather than transparently around the discussion table. Insight into the way influence was exerted can be gained by considering interagency relationships, particularly economic interrelationships. Initially the dominant association influencing conservation behavior was between the small woodlot owner and the sawmillers. The sawmills generally controlled prices by superior market knowledge and the leverage gained from vertically integrated operations. They regularly scheduled woodlands operations and controlled aggregate flows, not only from small woodlots and their own freeholds, but also to some extent from Crown holdings (MacQuarrie 1981). It was the increased intensity of forest harvest to meet sawmillers' demands that largely degraded the overall quality of the provincial forest.

With the expansion of the pulp sector, economic relationships between the stakeholders changed. The expanding market should have generated gains for small woodlot owners, but in fact this was not the case. Private woodlot production was suppressed by Crown license renewals, which often called for increasing production per unit of forest area (Johnson 1986). In addition, the stifling of free-market processes (Bissix and Sandberg 1992) and the structural power of the large commercial operators—especially the multinationals—acted to create paternalistic marketing relationships that generated little economic surplus for woodlot owners. The direction initially taken by the DFPIBs, and subsequently by the PFPIB to formulate forest practices regulations, threatened this *de facto* power. It was not surprising, therefore, that the multinationals continued to thwart the process of establishing forest maturity criteria and implementing forest practices regulations, thereby delaying and ultimately causing the failure of the FIA.

In a multiagency network, interagency processes combine in complex ways where outcomes rarely reflect aggregate inputs, but throughout there were few incentives for conservation. Over time, as the pulp sector markets grew and sawmills evolved and expanded in response to technological innovations, previously stable sawmill monopsonies gave way to larger, more pervasive and more complex pulp mill-driven, multiorganizational production combines. The established relationships between sawmillers and small woodlot owners were transformed to more onerous pulp sector-dominated political economies. In this context, two things became clear. First, the political wing of the provincial government could do little to promote forest conservation without the expressed will of key sector actors, especially the multinationals and senior managers within DLF. Second, over time, the multinational



pulp companies developed an uncompromising political economy with its own policy momentum, which was clearly aimed at forest exploitation rather than forest conservation. As a consequence, the workings of the PFPIB, although seemingly striving towards a better ecosystem management formula, stumbled under the weight of forest production influences.

During the 1970s, the multinationals consolidated their structural power over the forestry sector by building paternalistic market relationships with the sawmillers and campaigning against attempts made by small woodlot owners to introduce collective bargaining. In this manner, strong corporatist ties were developed with DLF, FIA implementation was stalled, the PFPIB process was frustrated, and environmentalists' opposition to conventional exploitation methods was undermined. By the early 1980s, the three major multinational pulp companies had firmly established three complementary and largely noncompeting monopolies. The multinationals exerted influence not only through their buying power, but also through the wholesaling of forest products. They rationed sawlogs to the numerous sawmills, giving each small amounts, rather than selling on the open market. This "supply-centered marketing" was first used to gain goodwill, but over time many sawmillers found that it had become a mechanism that controlled the margins of their annual income; the supply of saw logs to each mill represented only a small percentage of total wood fiber input, but was nevertheless significant for total profits. Sawmillers, once united in opposition to the pulp industry, were thus encouraged to acquiesce to, indeed even become proponents of, the pulp agenda (Clancy 1992; small independent sawmiller, *personal communication* [1987]). By the early 1980s, rather complex closed markets in forest products flourished, and the remaining industry stakeholders had become players, perhaps unwittingly, in a political economy increasingly defined by the multinationals' substantial forest exploitation objectives. Through their far-reaching tentacles of power, the multinationals were able to forestall or dampen political opposition to their forest practices and sidestep costly conservation measures.

By the late 1970s and early 1980s, open opposition to the pulp sector's domination from indigenous industry elites had all but dissipated (Clancy 1992, Wood Products 1984). The most consistent opposition came from within the PFPIB, which, surprisingly given the motives for its creation, was by this time heavily influenced by conservation proponents. Despite majority sentiment, the pulp sector was able to undermine this Board's political efforts through well-oiled "insider" influences. Over time, the multinational pulp companies formed close links with government officials from ground-level operators all the way to the Premier. Although structural and elitist influences dominated the forestry policy agenda one pluralist manifestation was significant. This was a persuasive grass roots opposi-

tion movement to areal herbicide spraying in Cape Breton. In the long run, however, it illustrates the problem that a grassroots movement, while able to generate considerable political controversy, often has limited real power to overcome structural power. The government sought to distance itself from the herbicide-spraying controversy by instituting a Royal Commission of Inquiry. This led eventually to FIA rescission. Although the FIA had, in effect, served to deflect the attention of environmentalists by engaging them in endless debates about management criteria, its very existence posed a threat to multinational interests, since it explicitly recognized local diversity in implementation.

#### LESSONS FROM THE FOREST IMPROVEMENT ACT'S POLICY WORKINGS

Although the Forest Improvement Act's (FIA) workings were often convoluted and indeed sometimes aberrant, the lessons learned during the implementation process are useful in understanding the complex organizational milieu through which biophysical objectives must be pursued. The FIA failed to develop an effective consensus about acceptable scientific principles amongst forest-sector stakeholders, at both the provincial or district levels. Rather than building consensus, it actually fostered acrimony. It also failed to have a positive impact on forest conservation at ground level; in fact, the FIA era was characterized by an unprecedented rate of forest exploitation and province-wide ecosystem degradation. Despite the legislation's reference to rather sophisticated integrative conservation principles, wood fiber exploitation processes drove the FIA policy process. Measures to accommodate multiple interests in the policy decision process were fundamentally tokenism. The devolution of plan making to DFPIBs (and later to the PFPIB) served to defuse political debate, but brought no action.

It became increasingly clear from the way the boards worked that the willingness to adopt scientific principles was as much about ideology and power as it was about scientific objectivity. Application of scientific standards to forest conservation is rarely costless, and decisions about whether to accept these standards are generally made using short-term balance sheet calculations. It is always difficult to convince industry, shareholders, and government that conservation costs must be borne in the present for the benefit of future generations, since their expectations and accountabilitys involve much shorter time horizons. In the case of PFPIB deliberations over the science of forest practices, heated debate over the costs and benefits of various harvesting techniques allowed the pulp industry to promote, for example, the virtues of clear-cutting under the pretext of ridding the province of "sylvian junk."

There are a number of broad lessons from the FIA that could be useful for other jurisdictions.

1) The experience of Nova Scotia's postwar conservation policy suggests that policy architects must be more sensitive to the broad political economy that tempers rational management and scientific application. Successful implementation of forest ecosystem management depends as much on brokering power amongst conservation and exploitation interests, including those bearing the short-term costs of conservation, as it does on ecological science. Although important in establishing the basic decision-making framework, debates concerning the validity of various conservation principles must inevitably be moderated by political calculations made in the context of a broad range of socioeconomic issues. In the multiagency ecosystem context, these calculations inevitably reflect the complex interplay of multiagency power and each agency's interests in the management of an ecosystem.

2) It is clear from the Forest Improvement Boards' experience that defining the conservation problem narrowly to include only forest practices is myopic. Attention cannot simply be focused on conservation, but must also address the broad influences over ecosystem exploitation. Clearly, in the FIA era, the market structure of the forest sector was crucial in shaping agency motivation toward conservation. Consequently, broad economic calculations are first necessary to put the conservation problem in perspective. Such calculations are also needed to evaluate the potential effectiveness of various ecosystem management intervention strategies; for example, when production expenditures exceed conservation investment by orders of magnitude, the efficacy of guidelines vs. regulations is called into question. Ecosystem managers must appreciate the way in which economic forces affect the ground-level decisions made by each relevant stakeholder group. In the FIA context, it was clear that subsidies to stimulate processing far exceeded conservation investment; conservation legislation was therefore significantly undermined, so resulting in substantial overexploitation of Nova Scotia's forests.

3) To appreciate the mechanisms through which power and influence are transmitted, ecosystem managers need to understand the decision-making linkages between stakeholders and the ways these will operate in particular situations. Knowing, for instance, the capacity of major companies to control key elements within the production economy, such as the multinationals' capacity in Nova Scotia to define pulpwood prices and supply requirements, is essential for designing policy interventions that address or circumvent such monopsony power.

4) Managers need to be wary of requirements to seek complete consensus among disparate forest management actors in order to move ecosystem management goals forward. As the PFPIB process clearly attests, consensus seeking can be undermined by powerful behind-closed-doors lobbying, and any agreements made in a multiagency forum must be transparent and all

parties shown to be accountable. Ground-level accountability (i.e., accountability to achieve agreed goals of ecosystem restoration, conservation, and protection) must always be the ultimate currency of negotiation and evaluation. It should be kept forever in mind, however, that corporations are always answerable first to distant shareholders (Adam Smith cited in Weale 1992), and they are most concerned with broad economic efficiency considerations rather than the effectiveness of local environmental management.

5) Effective ecosystem policy intervention is the art of the possible and is rarely the strict application of leading-edge natural science or best available technology. With hindsight, the FIA process suggests that greater environmental gains might have been achieved if conservation advocates had been prepared to make compromises, rather than adhering to their demands for more stringent scientifically based forest practices. One costly lesson was that indecision and a regulatory vacuum always favors production and exploitation interests to the overall detriment of ecosystem quality. In addition, there is a need for conservationists to heed the stark reminder that fights to prevent environmental degradation are never truly won. While certain battles may be successful, each success means that there are foregone economic opportunities that production interests will target in future battles.

6) When assessing stakeholder motives and capacity to address ecosystem conservation goals, it is critical to focus on past behavior and the external macropolitical-economic pressures under which they operate, rather than rely on statements of intent. In this context, assessing the impact of aggregate agency behavior in an ecosystem not only aids the evaluation of the overall capacity for change within the production system as a whole, but also provides a basis for the design of effective ground level interventions that are capable of promoting ecosystem goals.

Study of the FIA experience will have practical value in improving policy making and implementation only if the lessons learned are heeded and incorporated into subsequent ecosystem management efforts. What follows, then, is an examination of seven conservation initiatives that have been attempted or developed since the FIA's rescission.

#### SEVEN CONTEMPORARY NOVA SCOTIAN FOREST CONSERVATION CASE STUDIES

Although it could be argued that the FIA process had, in reality, dismissed forest conservation regulation as a useful policy tool, the enactment in 1986 of the Forest Enhancement Act (FEA) made this explicit. The forest industry could continue clear-cutting without defying forest conservation regulations. However, this state of affairs proved short lived. Three key interrelated developments shifted the prevailing rhetoric on acceptable forest practices, even amongst the products' industries. First, public concern about clear-cutting in-

creased throughout Canada, starting from intense criticism of the practice in British Columbia. Second, the Nova Scotian government came under political pressure to address forest conservation following the World Commission on the Environment and Development (1987) and the 1992 Rio Declaration, which spawned a range of international, bilateral, national, and inter-provincial agreements and treaties. Third, but of most importance, was the threat of a boycott of Canadian forest products by the European Economic Community unless more sustainable forestry practices were introduced. In response to this threat, a number of conservation initiatives were taken by the forest industry itself, which concentrated on ground-level forest practices, and others were initiated by governmental bodies, including one led by a preservation agency involving conceptually rather complex biophysical and socioeconomic dimensions.

Given the current salience of environmental and ecosystem management issues, it might now be thought to be easier to implement forest conservation measures (see Canadian Pulp and Paper Association 1999). However, recent evidence suggests this not to be the case either in Canada or worldwide (Firth 1993, Dudley and Sullivan 1995, May 1997). In Nova Scotia itself, the most recent attempts at strategic forest conservation management give only faint glimmers of hope; their workings largely suggest that lessons from the FIA were either ignored or simply not understood. These recent efforts are as follows:

*The Nova Scotia Envirofor process.*—The Nova Scotia Envirofor process, active from 1990–1993, was envisioned to cover the whole provincial forest ecosystem. It was a consensus-building process involving various forest management and environmental interests seeking to develop codes for acceptable forest practices. The Envirofor process was criticized, however, by two participating academics who argued in the following manner: “There is a danger that environmental issues will be defined superficially and descriptively, in an effort to avoid policy debate and to deny power relationships. The underlying premises are that direct personal contact among stakeholders promotes reasonable dialogue, and that the missing link is communication and education (Clancy and Sandberg 1992:219).

In theory, the Envirofor process would have enabled the government to gradually ratchet up forest practices regulations to foster sustainable exploitation as consensus developed. It failed, however, when behind-closed-doors negotiations occurred between the forest industry and government in order to circumvent the environmentalists. The process was abandoned in 1995.

*The St. Mary's Model Forest/Landscape Management project.*—This project was one of two applications made by Nova Scotia for funding under the Model Forest program of the federal Green Plan (Environment Canada 1990); it grew out of an earlier St. Mary's River Forestry–Wildlife project. The initial project was a co-

operative integrated resource management (IRM) venture between the Canadian Institute of Forestry: Nova Scotia Section (CIF: NS), Scott Paper, Stora, various federal and provincial agencies, and the St. Mary's River Association. While the IRM work focused on single forest stands and tested various ground-level forest management methods, the purpose of the Model Forest proposal was much broader. It was to “act as a prototype to test sustainable, landscape-based integrated forest resource management principles, and to disseminate the results.” (Hruszowy 1992:18) The 198 000-ha model forest was to be managed through a multi-agency system, organized on a hub-and-wheel basis. However, no funding was forthcoming from the Model Forest Program and, although, support was sought from elsewhere (Wildlife Habitat Canada 1993) the withdrawal of a major multinational caused the project to disintegrate.

*The Colchester/Cumberland counties integrated resource management pilot project.*—When initially announced in January 1996 (Nova Scotia Department of Natural Resources 1996), this pilot project involved all the Crown lands in Colchester and Cumberland counties, but was later expanded to adjacent counties. The project's remit was to apply integrated resource management principles across the forestry, minerals, and energy industries, as well as to recreation and wildlife protection. Its management team is drawn from the Department of Natural Resources (DNR) to include foresters, geologists, biologists, recreation planners, and land managers. This general concept is now being systematically applied to all Crown lands, but its objectives tend to be muted by the existence of extensive and intensive multinational cutting rights on most Crown lands. In practice, these rights are the driving forces behind forestry practice, rather than concerns for conservation and ecosystem health.

*Cape Breton Highlands Greater Ecosystem proposal.*—In contemporary history, the primary mandate of Parks Canada has been to maintain “ecological integrity through the protection of natural resources.” In recent years, however, Parks Canada has recognized the futility of attempting to achieve this without close cooperation with neighboring land, water, and environmental managers (National Parks Act 1988). National Parks' policy proposes the that “cooperative arrangements for complementary use and management of lands adjacent to national parks will be pursued with government and non-government agencies at the local, provincial, territorial and federal levels in order to maintain ecosystem integrity and to foster sustainable development (Canadian Heritage as cited in Bridgland and Marineau 1995:1).

The Cape Breton Highlands Greater Ecosystem proposal was an attempt to implement these ideas, using a hub-and-wheel multiagency management arrangement with Parks Canada at the center. However, political realities have intervened. Given the complexity of

the organizational milieu, involving as it does powerful agencies operating beyond National Park boundaries, problems have been encountered in gaining acceptance of the proposed management arrangements. The project still awaits official introduction; there is considerable sociopolitical baggage to overcome (Anderson 1997) before this idea can be effectively implemented, and it is likely that a more complex management system will be required.

*The Coalition of Nova Scotia Forest Interests.*—At the urging of the incumbent minister of Natural Resources, a Coalition of Nova Scotia Forest Interests was established in 1993 to consider forest sustainability and improved forest practices as the basis for a renewed silviculture program. This coalition included woodlot owners, sawmill operators, pulp and paper companies, forestry and silviculture contractors, Christmas tree growers, manufacturers of wood products, and forest industry workers. In its submission to government it recommended a buyers' registry, a forest practices code, a funding mechanism for tree-planting programs, and a sustainable forestry board to advise the minister. After three years of behind-closed-doors discussions, this initiative ran into significant opposition, was rejected in public hearings (Sears 1996), and was abandoned.

*Forest products certification.*—The impetus for certification ostensibly comes from two related motivations: first to stimulate more environmentally friendly forest practices; and, second, but probably of more importance within the industry, to provide a marketing tool. The drive for certification comes from two distinct camps in the forestry sector: the Forest Stewardship Council (FSC) and the International Standards Organization. While the former is a grassroots organization dominated by environmentalists and small- to medium-size forest managers, the latter is spearheaded by the mainstream forest industry with the assistance of the Canadian government (Elliott 1996, Forest Stewardship Council Notes 1996). Whereas the FSC certifies the product from source and tracks it to the retail outlet or the place of consumption, the Canadian Standards Association only certifies the management process (Canadian Standards Association Sustainable Forestry Management 1996). Although the CSA is more financially stable, its sustainable forest management standards have a major credibility problem; the certification approach does little to guarantee that the products actually come from sustainable sources (Elliott 1996).

*Toward Sustainable Forestry policy.*—The Nova Scotian government's latest foray into forest conservation policy is an interesting departure from past initiatives. In October 1997, the Department of Natural Resources published a position paper entitled *Toward Sustainable Forestry*; this document primarily rose out of the ashes of the aborted Coalition of Nova Scotia Forest Interests proposal, which was aborted following public opposition (Sears 1996). The document recog-

nized that, in Nova Scotia, the preponderance of privately owned and managed forestry land represented a management challenge. It also admitted that forest fiber demand was outstripping supply, with the result that there was extensive and clearly unsustainable exploitation of immature woodlands. More intensive forest management, with extensive replanting and silviculture, was once the hope for higher sustainable wood fiber yields and forest conservation, but such intensive management depended on large federal/provincial forest production subsidies, and it was now acknowledged by the government that the era of input subsidies was over. Significantly, it recognized that the time had come for regulatory enforcement; although, somewhat anomalously, it dismissed both direct regulatory intervention (on the grounds of the inviolability of land ownership sovereignty) and the use of green taxes. It was conceded, however, that there were legitimate public interests in maintaining the wide range of nonproduction benefits generated by forests and that a hands-off regulatory policy was not appropriate when environmental goals (such as biodiversity) were threatened (Natural Resources 1997). The position paper argues that greater responsibility for resource maintenance should be placed on those directly creating the demand for forest products, i.e., the wood processing industry and its customers. It further suggests that processors should manage a production levee dedicated to forest renewal (a green tax by a different name).

#### *Lessons learned and ignored*

Evidence that attention has been paid to the FIA's lessons and the need for meaningful support for conservation is mixed. The Envirofor process, the St. Mary's River Model Forest, and the Cape Breton Highlands Greater Ecosystem (CBHGE) management examples all sought consensus amongst diverse, numerous, and traditionally fractious ecosystem agents. As this approach had failed during the FIA era, there was little prospect that subsequent attempts to reach consensus would be any more successful unless the underlying interests of the most powerful stakeholders had shifted. In the Envirofor and St. Mary's cases, success seemed possible until the multinationals recognized that agreement would only be reached if they accepted forest practices with significant short-term costs and, in effect, relinquished a significant element of their decision power. In the Cape Breton Highlands case, the scope for conflicts of interest was considerable. Although to achieve the ecosystem protection goal for the park it was necessary to involve a wide set of agencies, park managers understood the pitfalls of outsider participation when many local interests were skeptical of, and even hostile to, national park objectives. In all cases, no matter how long the relevant actors engaged in harmonious discussion, none of the so-called "partnerships" could work without appropriate ecosystem management incentives. Although

there is clear evidence that federal/provincial subsidies have been highly effective in stimulating pulp industry expansion, forest harvesting, forest type conversion, and silviculture programs (all of which have tended to accelerate ecosystem degradation), there has been a marked reluctance to shift such incentives towards forest maintenance or restoration.

In contrast to efforts to build wide consensus, the Integrated Resource Management pilot project on Crown lands reduced ecosystem decision making to a single agency controlling external agents. The management team was drawn solely from the DNR, and outside interests were deprived of a central seat in the decision process. However, such an exclusionary approach cannot conceivably succeed in a multistakeholder context, particularly when Crown land boundaries rarely conform to those of natural ecosystems or to the jurisdictions of other important agencies. Similarly, the Coalition of Forestry Interests avoided key representational issues by creating a pseudoconsensus around like-minded industrialists. Although the FIA process showed quite clearly that a meaningful and lasting consensus was problematic whenever industrialists and environmentalists were seated at the same table, largely because they had uneven access to political power, it also showed that no lasting forest sector peace was possible without them.

Interestingly, the certification process avoids the need for broad consensus in a very different way; it takes a bottom-up approach, cutting through the multiagency milieu to directly influence forest managers. It simultaneously promises a sound economic basis for sustaining forest conservation practices and deals effectively with the free rider or nonparticipant (see Weale 1992). In theory it allows the customers for forest products to make informed purchasing choices and, assuming they value goods produced on a sustainable basis, incentives are provided for ecosystem-based forest conservation management. However, for this to occur, certification has to be more than window dressing; it has to be credible and verifiable, and it is by no means certain that current systems will actually promote meaningful forest conservation in terms of adequate ecosystem coverage and quality enhancement.

Although the latest attempt by the government to establish forestry policy through its 1997 position paper clearly recognized the problems inherent in current management arrangements, it failed to address them. The only suggested way forward, the proposed forest renewal levee, ignores the fact that the product-processing industry has monopsony power and an obvious production bias. Entrusting the management of the levee to the processors will do nothing to stop them continuing to distort conservation policy to further their own production ends.

#### CONCLUSIONS AND RECOMMENDATIONS

It is clearly recognized that this analysis raises more questions than answers regarding the development of

workable prescriptions for forest ecosystem management. However, it does identify the pitfalls involved in attempting to implement strategic ecosystem management approaches in a multiagency, multistakeholder context. These have relevance both for those policy architects and natural resource scientists who spearhead or provide advice in the ecosystem management process. There are no simple solutions, and no single organizational structure is appropriate to all situations. Much will depend upon the creation of a shared need to adopt sustainable practices, but such a need will not emerge until the incentives for conservation are made to outweigh the short-term but ultimately unsustainable benefits from production.

All the examples referred to in this paper have clearly demonstrated that ecosystem management efforts cannot succeed over the long term, where resource exploitation pressures far exceed the drive for conservation and where the political will and capacity for statutory control to enhance conservation is weak. While forest products certification shows some potential as a marketing and demand management tool, and a production levee could provide continuous funding for forest renewal, there is little to suggest that they will be sufficient to resist future pressures for ecosystem degradation. As presently structured, the multiagency political economy contains too much inertia for the current approaches to conservation to have any substantive influence over long-term ecosystem restoration. The distortions created by the highly imperfect forestry markets, and the symbiotic relationships between government departments requiring revenue and economic development and companies seeking profits through the use of low-cost production techniques, have an all-pervasive influence over the real capacity for a significant policy change. Here, in the context of understanding an agency's willingness and capacity to implement ecosystem management goals, it is important to trust an agency's history of ground-level behavior, rather than depend upon its liberally stated intentions.

What the FIA and other Nova Scotian conservation experiments have in common is first their failure to take explicit account of the profound influences over conservation decision-making of the market (and of extant production and management ideologies); and, second, to oversimplify the distortions possible when policy instruments are applied through complex multiagency processes. The assumption appears to be, contrary to available evidence, that justice will eventually prevail if the various interests keep talking. At least in Nova Scotia, this approach has been ineffective in propagating conservation practices that are likely to be meaningful in the long run.

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