

Forestry, Science and the Prospects for Political Coalition Building: The Woodlot Movement in Nova Scotia, Canada

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Paradigmatic assumptions, once established, can prove extremely durable and difficult to dislodge. This is as true of public policy as it is of science, since the sponsors and authors of a major policy can be expected to defend their creations with both vigour and tenacity. At the same time, it poses grave challenges to those political out-groups whose interests are subordinated by the policy in question, and those which seek redress. Too little is known about the processes which entrench such paradigms and the processes by which they are undone. One such case is explored here. It involves a complex interplay of scientific, professional and political initiatives in the primary forestry field in the Canadian province of Nova Scotia.

The period 1955-75 was one in which modern silvicultural practices were being forged, requiring choices to be made from many alternative currents and claims. Not only was forestry science in flux, but industrial and state agents were reconsidering their commitments to forest management for renewable yields. This paper is particularly interested in the position of small scale private owners of woodlands (known locally as woodlots). Accounting for more than half of the forested area of the province, they have faced great obstacles in collective organization. As resource owners and prospective managers, the woodlot segment had a heavy stake in the outcome of the silviculture debates. From the outset the woodlot movement embraced the cause of forest improvement. Yet in the final analysis the movement was marginalized in policy, its commitment to management dismissed and its potential as a vehicle of forest renewal ignored.

The scale and durability of these negative premises are reflected in a variety of speeches, reports and policy statements of the time. The state forest agency, the Department of Lands and Forests (DLF), argued that small woodlot owners were neither inclined by nature, nor suitable for training, to embrace modern forest management practices. Private woodlands had been extensively depleted through highgrade lumbering during and after World War Two. In the eyes of state authorities, woodland owners were complicit in the degradation of their resource. Lacking formal training in forestry techniques, and lacking an organized infrastructure of their own, the small private owners were routinely described as short-term liquidators interested in fast income, as distinct from long-term stewards with a commitment to managed stock. The fragmented private tenure pattern, in which more than 30,000 owners controlled more than 50 per cent of provincial forest lands, was singled out as a structural impediment to scientific management, a historical anomaly from which professional foresters in the rest of Canada were fortunate to be spared.

Significantly, these largely impressionistic views escaped empirical test for almost twenty years. It was not until the 1970s that the first systematic surveys were undertaken of woodlot owners. This revealed that the majority of (legal) owners were elderly (predominantly over 55 years of age), were occasional rather than regular marketers of wood, and held little interest in more extensive production and sale. Since it seemed to confirm prior assumptions, this snapshot of woodlot opinion was taken as conclusive evidence of the social and structural limits of small private tenure. As late as 1970, the senior official in the DLF told a pulp and paper trade group that the Nova Scotia woodlot segment remained an great impediment to modern forest management:

We can only persuade. To say to John Farmer that he should practise silviculture to optimize fibre production for the good of his province is asking for trouble. Even to offer silviculture incentives is not going to be enough: John Farmer may not even know what silviculture means, let alone believe it's any good.¹

So often were these themes repeated by business and political officials that they became part of a virtual house philosophy for the forest establishment. However questionable in fact, these premises have shaped and perpetuated a policy framework which effectively dismisses small private owners as a significant element in forest management, business and policy questions.

These social and technical premises are of the greatest consequence, since it was in this same period that scientific silviculture is generally considered to have arrived in corporate and governmental circles. What accounts for such an ideological shading of the largest block of forest land owners in the province (collectively owning half the total area)? It is tempting to blame the technical forestry paradigm of the day, which carried strong but submerged social assumptions which denied the significance of small landowners. Or the political leverage of corporate pulp and paper enterprise, which opposed organized commodity marketing for private wood producers. Or the institutional interests of a state forestry agency which resented its relative lack of crown reserves and refused to adapt to the reality of small holder tenure.

Each point carries some force. However they fail to explain the entire story. There were a small group of professional foresters in Nova Scotia, committed to the woodlot owner movement and arguing vigorously for a non-industrial forest tenure solution. Moreover, forest industry opposition to state regulated commodity marketing did not prevent such arrangements from being enacted in the neighbouring provinces of Quebec and New Brunswick. And finally there are examples, in Scandinavia and elsewhere, of forest agencies turning the reality of private forest tenure into a programming strength by promoting political organization and coordinated research for private forest owning majorities.

It is necessary, then, to explain how one forest policy project advanced by woodlot owners was defeated by alternative projects sponsored by forest industry processors, professional foresters and state forest agencies.

The Epistemic Community and the Policy Cycle

Two conceptual frameworks prove particularly helpful in this respect. The first of these highlights the significance of scientific ideas in both building and blocking the emergence of political coalitions of interests. The concept of "epistemic community" captures the phenomenon of "networks of knowledge-based experts" which can shape the way policy problems are represented or understood.¹¹ It is the quality of policy-relevance which gives salience to select bodies of knowledge or information. As Haas puts it, the causal logic for epistemic community impact entails the sequence of uncertainty -- interpretation --and institutionalization. In the face of complicated policy issues, professionals with policy-related expertise offer coherent frameworks for understanding the links between action and outcome, and such knowledge networks may be embedded into the policy solutions which follow.

Not surprising, many of the most significant epistemes, or worldviews, emerge from fields of science, given its privileged modern status as "*the* source of cognitive authority." However an organized scientific discipline is not, ipso facto, an epistemic community for policy purposes. It is the active process of adapting knowledge domains to discrete problems in policy issue-areas that builds an epistemic community. Clearly the process of epistemic definition and entrenchment is politically critical. In this paper, the epistemic maneuvering over Nova Scotia forest management schemes during the formative post-war years sheds new light on the rise of clearcut harvesting systems. It reveals that this occurred in the face of rival visions, backed by distinct institutional orders of woodlot NGOs, corporate woodland enterprises, and state forest agencies. Significantly, threads of scientific knowledge were available to support all three, though ultimately the mantle of forestry science was appropriated by the dominant outcome.

To illustrate the origins and substance of rival threads and policy agendas in Nova Scotia forestry, the following sections examine developments in the private woodlot movement, the corporate sector and state forest agencies, respectively.

Organized Woodlot Owners and Private Forest Management

First, what was the outlook of the modern woodlot owner movement? What role if any did private forest management have in its scheme? Although more than 30,000 individuals own small woodlots in the province, they have traditionally been an isolated and unorganized segment, lacking any structure to define and articulate their shared interests. This is particularly revealing, since the woodlot owners collectively control more than half of the forested acreage of Nova Scotia. In organizational terms, their situation entering the 1960s contrasted sharply with another small producer segment in

agriculture, though it more closely resembled a third case of the small boat inshore fishery.

The St. Francis Xavier University Extension Department was involved in at least two campaigns prior to the woodlot owner organizing movement of the 1960s. The first began during the depression years. In 1934 Rev. A.B. MacDonald began acting on behalf of the Eastern Lumber Marketing Committee, an intermediary for community co-operatives and farmer clubs in eastern Nova Scotia seeking to sell a variety of local wood products. One possible outlet was to sell pit timber to Dominion Steel and Coal Co. in Glace Bay. Other products included pulpwood (to Mersey Paper), hardwood blocks (again to DOSCO), and lumber and railway ties. Export markets in Britain and the United States were also explored, with the help of the Marketing Branch of the Agriculture Department and the federal Trade Commissioner in New York.

The second occurred twenty years later. Beginning in 1953, Atlantic Forest Products Co-operative Association, a forest products cooperative based again in eastern Nova Scotia, began shipping christmas trees to American dealers. However beset with quality problems and questionable grading, Atlantic slipped into a sea of red ink and was taken over eventually by Eastern Co-op Services, in the winter of 1956. This bitter experience remained within memory when the 1960s campaign was launched, suggesting to some the danger of "over-eagerness 'to do something' without taking enough time to acquire the specialized knowledge and wisdom that is essential to sure-footed action in any field, especially co-operative undertakings that involve many people."ⁱⁱⁱ

In exploring the formative phases of the third woodlot movement, three questions are of special importance. How were issues of silviculture (the growing of trees) and harvesting (logging) understood during this time? What was the extent of woodlot owner commitment to forest management? And how were their initiatives received by the two key institutional orders of business and government?

No less a figure than Rev. Dr. Moses Coady had been drawn to the forest resource as an outlet for the Antigonish Movement. In 1949, Coady acquired a copy of Glesinger's *The Coming Age of Wood*. On the strength of this book "he declared on numerous occasions that if he had realized the possibilities of the forests he would have started with forestry at the very beginning of his adult education and extension work."^{iv} In the spring of the following year, Coady delivered an address in Fredericton on the topic of "Forestry and Social Progress", where he endorsed forestry as a means of social improvement, referring in particular to its "scientific" underpinnings.^v

In this light it is hardly surprising that forest issues drew repeated attention at the Rural and Industrial Conferences convened by the Extension Department through the 1950s. For example, the 1954 Conference heard from the head of the Forest Products Laboratories of Canada on the economic importance of sawmill wastes as a pulp input. The Nova Scotia deputy minister of Trade and Industry stressed the importance of creating a woodlot owner organization which could disseminate scientific principles of forest management, while the deputy minister of Lands and Forests explained the

province-wide forest inventory then underway.^{vi} Four years later, a keynote address by forester Ellery Foster promoted the co-operative philosophy of the Coady-Tompkins movement to enhance the forest base and the forest industry.^{vii} Finally, in 1960 the delegates were told of the urgent need for municipal and provincial authorities to reform the taxation of freehold forest land if continuing silvicultural investment was to be realized. Another speaker emphasized the importance of adopting management practices to reverse the long run trend of forest degradation.^{viii}

Running parallel to these public education conferences was an escalating effort to promote woodlot owner organization in eastern Nova Scotia. This gathered momentum in response to two key commercial events of the 1950s. First came the construction of the Canso Causeway, opening a permanent road link between Cape Breton Island and the eastern mainland in 1955. At the same time, regional politicians formed the Four Counties Development Association, which lobbied strenuously for the location of a modern integrated pulp and paper complex at the Strait of Canso. This was realized in 1959, when Nova Scotia Pulp Ltd., a subsidiary of the Swedish firm Stora Kopparberg AB, announced the construction of a sulphite pulp mill at Point Tupper. As this facility planned to use 250,000 cords of softwood fibre annually, a vast new market emerged for small diameter spruce and fir in the degraded forests of eastern Nova Scotia. While 150,000 cords per year were expected to come from NSPL's lease to more than a million acres of crown forest land, the remaining 100,000 would be purchased from private woodlot suppliers. Based on its long experience with private woodlot owners in Sweden, Stora saw no difficulty in dealing in Nova Scotia. Yet while the company also had several decades of experience with woodlot owner associations in Sweden, it was far less willing to accept this corollary in Nova Scotia.

The NSPL leasing arrangements lent new urgency to the organization of private woodlot owners, particularly as the mill moved toward the construction phase. The St. F.X. Extension Department decided that the "talking stage of adult education in forestry had progressed far enough" and an organizing campaign was launched. A meeting in January 1959 brought together representatives from the provincial departments of Agriculture and Lands and Forests, the co-operative movement, parish priests, and Extension. With an emerging consensus on the need for action, there was discussion of both wood marketing and forest management programs.^{ix} The Extension Department hired an organizer and local meetings began in the summer of 1959 to explore the concerns of potential members. It soon became clear that these revolved around "management ... education and prices".^x

From the outset, a tension was evident in grass roots opinion, between those who saw an association as an instrument for higher wood prices alone and those who saw management and marketing as indissolubly linked. By one report, the Extension organizer found that "a program of woodlot management is difficult at present. At this time [1959] the owner is interested only in knowing the price the company will pay for a cord of pulp. Therefore a working program will have to wait until the mill is built and operating."^{xi} On the other hand, the deputy-minister of Trade and Industry, John Bigelow (himself a forester) was supporting the organizing campaign and insisting that

conservation was essential to maximize woodlot income: "Mr. Bigelow is most concerned with the farmer. He warns that he must not cut too much at one time. He must be taught to cull and forest when necessary. With a little management, the woodlot can be [sic] a cash crop for generations."^{xii} These contradictory impulses continued over time.

Early in 1960 the pace accelerated, with more than forty community study meetings being held in the six eastern Nova Scotia counties in only two months. Resource persons were supplied by the Federation of Agriculture, the Four County Development Association, and the provincial departments of Agriculture and Lands and Forests. Preliminary lists of members were compiled, and questionnaires distributed on lands and logging practices. Throughout this blitz of activity, the Extension group took pains to maintain the institutional support of the bodies mentioned above, to guarantee "unanimity of purpose and method". Also in January, Rev. Gillis wrote to E.D. Haliburton, the minister of Agriculture and of Lands and Forests, notifying him of the organizing program. Speaking to an Agricultural Conference in Truro at the same time, Gillis stressed the link between organization, knowledge and prosperity:

Our best farmers are the most advanced scientifically, which points up the need for education. If we are to do a thorough job in forestry we must have an educational set-up similar to that in Agriculture. We need short courses and demonstration plots. Just as we have Experimental Stations at Nappan on livestock and Kentville on fruits and vegetables, so we need an Experimental Station on forestry in Mabou. ... There is no substitute for knowledge and we must get forest knowledge to our people as quickly as possible. Our people will do a good job on the production and orderly marketing of forest products, just as they have done with other farm products, if the opportunity is provided for them and they are properly and justly remunerated for their efforts. This has not been possible in the past and this is why we have had such wholesale exploitation of our forest lands...^{xiii}

The Extension Department was able to link its broader programme to the organizing campaign. In mid-February a radio broadcast in the regular series "Life in These Maritimes" was devoted to woodlot management issues. It outlined "the importance of managing a farm woodlot so that it will yield the most wealth, not in one year, but every year in the lifetime of the farmer and be passed on to the next generation as a capital investment with yearly returns".^{xiv} In a question and answer format, it covered basic silvicultural and harvesting issues including appraising the forest as found, managing second growth and all aged forests, clearcutting and selection cutting, and fire, insects and diseases. Where conditions allowed, selection cutting was endorsed:

A forest with trees of all ages, and all kinds is the easiest to conserve. If insect pests strike, they will attack only certain species of trees and the whole stand will not be eliminated. Over a period of years, an even-aged forest may be converted into an all-aged forest by cutting patches that are widely scattered. The size of the patches should be only about as high as

the height of the trees - to prevent too much wind and sun from getting in. The all aged forest should be thinned and cut as it matures. It will continue to yield because seed trees will reforest it, and the young trees will have an opportunity to grow. Sturdy trees with developed crowns, mature enough to give a good crop of seed should be left for the purposes of restocking.^{xv}

The Extension Department also assembled staff resources of its own. An American forester, Ellery Foster, had been recruited to provide professional support. Foster fit easily within the St. F.X. programme, as he believed strongly in the potential of co-operative institutions for small woodlot forestry. With experience in overseas development in the 1950s, Foster had written about "bottom-up" community organizing for economic development in India, a case which could be advanced with equal enthusiasm in rural Nova Scotia.^{xvi} Speaking at the 1958 Rural and Industrial Conference, Foster outlined a comprehensive and farsighted list of issues for public attention. These included: the need for a new industrial wood purchasing enterprise, collusive behaviour by existing pulp buyers, the value of woodyards to facilitate the buying and selling (and thereby integrated use) of all forest products, the scientific management of community (and municipal) forest lands as demonstration sites, and the shared employment of co-operatively minded foresters by voluntary institutions.^{xvii} By 1960 Foster was a consultant forester on staff at the Extension Department, where he turned out forestry reading lists, proposals for "needed forestry work", and co-operative forestry strategy documents for eastern Nova Scotia. These were notable for combining a high level of technical rigour, a practical orientation and a philosophical commitment to Antigonish principles.^{xviii}

Foster was a vigorous advocate of partial cutting for stand improvement. This he described as:

Conservation timber cutting under the direction of a trained forester or practical woodsman carefully trained by him. In general, the most productive forestry consists of frequent light cutting of trees marked by the forester ... Under this system usually not more than 25% of the timber in a stand is cut at a time, but cutting is done every five to ten years. This method will yield up to twice as much timber as the system where stands are merely clearcut when mature with no intermediate thinning. Under some conditions, however, the only practical thing to do with a given patch of woods is to clearcut it and start over with a stand of baby trees.^{xix}

Foster had no doubt that both forest development and forest product income could be vastly improved by the organization of small forest owners. He told the Maritime Lumber Bureau that "It is my hope that woodlot owners, through their association, will be able to help develop a system of forest production that will put each part of each tree to its highest use and that will not overlook the advantage to woodlot owners and to the general welfare of sawlog forestry rather than mere pulpwood forestry."^{xx}

By 1962, St. F.X. University had taken further steps toward forestry programming. It had hired a forest biologist onto the Faculty, and established a two-year university course from which student could proceed to Fredericton to complete the B.Sc.F. degree. It had also acquired the Crystal Cliffs farm and woodlot property from the provincial government, and planned to operate it as a demonstration training project.

This, however, lay in the future when the 1960 organizing campaign began. After the encouraging results of the community meetings, some sixty delegates were summoned to a founding meeting in Port Hawkesbury in March. Here a provisional executive was selected, with Cape Breton dairy farmer Wendell Coldwell as President. Of equal importance, a set of objectives were formalized. These six objectives clearly convey the dominant concerns of the new group, and underline the central place of forest management practices:

1. To foster an appreciation of our forest resources.
2. To take whatever measures are necessary to protect the woodlots of members.
3. To assist members in the management of their woodlots.
4. To have a united voice in negotiating terms and conditions of contracts for forest products.
5. To work with government departments and other agencies to develop our forest industry to its fullest potential.
6. To obtain information on markets for different kinds of woodlot products and assist woodlot owners in the marketing of such products.^{xxi}

Without question, the orientation was one of planned management for forest improvement, maximum production and return. Indeed the films screened at the study meetings carried a strong message, about

how a woodlot owner robs the future of himself and the family when he clearcuts his woodlot; how with help and training from a forester most woodlots can be made to yield some income every year and at the same time speed their growth of timber for future harvests; and how by co-operating together to sell timber in such quantities as carload lots, neighbouring woodlot owners may sell their wood crops in markets that will bring them the best price. (2)

Coldwell convinced the WOA executive to stay clear of wood purchasing issues in the initial phase (mindful no doubt of the fate of the former Atlantic Forest group). This allowed them to take a "soft approach" to relations with both Stora and the provincial government.^{xxii} The membership drive was continuing, and the embryonic group was in no shape for a fight. Over the next year the numbers continued to mount, surpassing 1800 by the autumn of 1961. The attainment of this threshold posed new tactical questions. For many, further enrolment hinged upon a role in pulpwood marketing. Though he agreed with Coldwell's "go-slow" approach, J.A. Gillis reminded the leaders that a firm policy on bargaining was essential, as most people considered it the only justification for

the organization.^{xxiii} John Bigelow, who advised Gillis throughout, and served as a liaison with Stora, reported on the company's reaction: "They would prefer that the Association not be formed, but were prepared to accept them. At first they were concerned with the price bargaining clause in the objectives." By now Coldwell too had developed a shrewd appreciation of the membership's expectations. Personally, he was convinced "that conservation was more important, but as this was not the view of most people, the price question would be the sugar used to coat the conservation pill."

Certainly inaction had its costs, since Stora was already buying pulpwood on an individual basis from private landowners. Consequently, by year-end, the WOA had settled on a strategy, modelled upon the organized marketing of many farm commodities. It requested the Stanfield government to add forest products to the list of commodities covered by the *Nova Scotia Marketing Act*.^{xxiv} This was reinforced by the discovery that Quebec legislation authorized private producer boards to market logs and pulpwood, with the support of 60 per cent of the producers within the designated region. The Quebec government had just ordered the Canadian International Paper Co. to sign three year contracts with two such (farmer) producer boards.^{xxv}

In 1962, the Nova Scotia statute was amended to include forest products. However by the time the WOA applied to the Cabinet in 1963 to authorize a forest products board, political resistance had stiffened both in business and government. Stora was experiencing start-up difficulties in the mill, amidst soft pulp markets, and lobbied vigorously against any scheme threatening higher fibre costs. Within the provincial state, the support which the woodlot movement had enjoyed from the Department of Agriculture (and from Bigelow in Trade and Industry) was now offset by opposition from other ministries. The deadlock was resolved to the detriment of the WOA. Without responding directly to the Association's application, the Cabinet appointed a Royal Commission in 1964 to investigate the price of pulpwood. This necessitated a tremendous diversion of Association energies, at both the central and local levels, to prepare, present and defend its views in the formal political arena. Almost a full year elapsed before its Report advised that a well-organized woodlot association be achieved *before* the question of marketing was addressed again.^{xxvi} Internally, the WOA suffered another serious blow. Wendell Coldwell's barn was destroyed by fire in the spring of 1964, with a significant loss of livestock, and serious questions about his future livelihood.

By severing the processes of organizing and marketing, the Commission undercut the woodlot movement's political strategy and imperilled its long-term prospects for success. With the WOA becalmed, the Nova Scotia Federation of Agriculture agreed to assume organizing responsibilities. However it was the St. F.X. Extension Department which revived the momentum in 1966, when it won federal government support for a three-year organizing drive. In effect, the opening phase of woodlot mobilization was over and the next phase was pursued on a province-wide basis. The Nova Scotia Woodlot Owners Association (NSWOA) held its inaugural general meeting in 1969 and launched a new pulpwood marketing initiative the following year.

Nonetheless the 1955-65 period had been crucial. It saw the transformation of the forest industry in eastern Nova Scotia, as the pulpwood market intensified. Alliances and

antagonisms were formed which would persist for decades. The roots of these solidarities need to be well understood, particularly on the silviculture and marketing nexus. The following sections address relations between the woodlot movement and the new pulp industry, and the Department of Lands and Forests, respectively.

Nova Scotia Pulp Ltd. and Private Forest Management

As mentioned earlier, the smallholder tenure pattern in eastern Nova Scotia posed little initial concern to Stora and NSPL, given its lengthy experience with private landowners in Sweden. There was one overriding difference, however. Whereas the Nova Scotia woodlot owners lacked any tradition of organized action, their Swedish counterparts had long been organized at the district level (into 24 Forest Owners' Associations) and the national level (into a National Federation founded in 1932). This structure embraced more than 126,000 members in 1958, whose total forest acreage reached 6.5 million hectares (approximately 50 per cent of Swedish forest land). Furthermore these associations diversified vertically into several processing industries, through their ownership of four pulpmills, seventy-five sawmills, and several dozen other factories.

Hans Lindberg, the NSPL Woodlands Manager, had conducted the company's forest inventory in 1957 and was well acquainted with eastern Nova Scotia. Despite the heavily degraded forest base of the time, Stora was more impressed with its potential for growth under sound management. Consequently NSPL designed a Woodlands Division to handle both crown and private lands. Lindberg's Chief Forester, Jan Weslien, was in charge of the "Extension Department" which was designed to deal with private landowners, while the Assistant to the Manager, Murray Anderson, handled provincial government relations on the crown lease. The overall catchment area of the seven eastern counties was divided into three Divisions (New Glasgow, Mulgrave and Baddeck), each with a Divisional Forester, several Rangers and a clerk. These Divisional Offices were responsible for both pulpwood purchasing and crown land operations in their areas, each generating a total of 80,000-100,000 cords per year.

Through 1960 and 1961, NSPL held meetings and established working procedures with sawmillers, logging contractors, truckers, private wood buyers and woodlot owners. Interested owners were given copies of a looseleaf "Forestry Guide" in 1961. This set out purchasing specifications, cutting guidelines and management options. It stressed that the company wished "to encourage proper management, not mining". In an information paper distributed at early orientation meetings, Lindberg addressed forest management practices at some length. He stressed that the company would promote a management scheme adapted to Nova Scotia realities, rather than the classic Swedish system. The essentials were a fifty year rotation age, progressive clearcuts and cleaning operations on young regeneration:

If we believe that the biological and economical rotation age of the principal species is about 50 years, then we must have the courage to

regenerate a new stand at that time. Most of the 50-year stands today have a great number of comparatively small trees. We know that it was very common to cut around fifteen cords per acre in an old stand twenty or thirty years ago.

Now we know that the average cords per acre is somewhere about seven cords. Can we do anything about this? As we know, the total wood production is the same if you have 5000 trees per acre or if you have 500 - it is very important to put this production into merchantable trees, our aim will be to harvest as much wood as possible in merchantable trees.

That is why we are thinking of cleaning young stands - this means to release a good number of stems per acre and let them grow as fast as the site permits. Between 1,000 and 1,200 stems per acre might be a good figure for ten-year old stands. If it could be possible to clean a young fir stand and at the same time harvest Christmas trees, it would help to pay for the cleaning.

If you wish to work on a sustained yield basis in the woods, you must look into the future. We know that on most sites wood growth is better in well, even-aged stands [sic] both from an economical and biological viewpoint. If we would like to have mature stands in 50 years from now, we have to start to grow new stands today. That means that if we have a total area on Crown lands of about one million acres and we consider that the average rotation age to be 50 years [sic] - then we have to clearcut 1/50 or 20,000 acres per year and we will have to start today. This system could not be applied to the average small woodlot but the principles would be the same.^{xxvii}

If this was the system of the future, company woods officials were under no illusions about the point of departure. Forest stand quality was generally poor and silvicultural effort was low. In one report to Stora headquarters, NSPL Chief forester Jan Weslien (the man in charge of "extension forestry") described Cape Breton wood cutting and collection as following "stone-age methods". Presumably this referred to the absence of mechanization. Prior to the arrival of the articulated skidder in Nova Scotia in 1961, small crews felled trees and hauled by sled to loading brows on streams or roads. The power chainsaw enabled one man to produce a cord per day, surpassing two men with handsaw or axe. By comparison, a crew equipped with power saws and skidder could produce five cords per man per day, and could move the wood faster and further from the stump and in all seasons.^{xxviii} Since NSPL opted to use contract loggers for all of its woods operations on crown land, the company provided technical and financial support to build up a network of year-round "custom logging" crews equipped in this way. By the early 1970s, approximately half of the crown land harvest was produced by this "packsack" method.

The next stage of mechanization involved the forwarder, which relied on a grapple loader and a rack capable of carrying 3-4 cords of eight foot wood at a time (compared to one cord for the skidder). The more flexible gathering capacity of the forwarder increased cutting crew productivity. Where the skidder required piles of a full

cord (45 pieces), the forwarder could handle piles one-third this large, leaving more time for cutting. (It was not until 1970 that Koehring mechanical harvesters first appeared on the Cape Breton highlands. Here a single operator shears, delimits, and cuts the stem to length, and transports a 7 cord load to roadside. Operated in shifts around the clock, a harvester can generate 60 cords per day.^{xxix}

Significantly, It was NSPL's pursuit of mechanization on its crown lease that served to narrow its approach to private woodlot logging as well. While axe, saw, and horse or tractor-hauling were well suited, both by cost and scale, for owners to make partial and repeated cuts from lots of several hundred acres, this was not the case for the packstacking contractor. On the crown lease, NSPL prescribed a system of clearcutting on forty-five foot wide strips, thereby maximizing the volume of pulpwood which the contractors took off the land. Not surprisingly, the logging contractor brought this same system to private land operations. In effect, the woodlot owner's management options were restricted, in the event that contract logging services were required. By selling stumpage (i.e. the right to cut and remove trees) to a contractor he effectively lost control of the harvesting technique, though the harvest volume could be stipulated in the contract. By hiring a contractor's services to cut and land the wood at roadside (where the owner could sell to the company) he still faced either pressure or an ultimatum for clearcut techniques. While skidder logging was perfectly compatible with partial cuts of selected trees along forest trails, it followed an entirely different commercial logic than that of crown lands.

Neither was Weslien optimistic about the potential for forest conservation and management commitment among small woodlot owners. In 1964 he painted this portrait to a meeting of provincial professional foresters:

Now take the woodlot owner in Nova Scotia owning a couple hundred acres with very little merchantable wood left on it. He has no permanent job, though he may be making some money loading boats, working on the highway, helping a neighbour building a house, and during a great part of the year he is on UI [unemployment insurance]. How can you expect him to spend a couple of hundred dollars or more on replanting the area that he cut five years before, if no satisfactory regeneration has shown up during that time?^{xxx}

It is evident that a combination of crown logging plans, high intensity logging contractors and socially slanted assumptions about the private woodlot sector, inclined NSPL to marginalize the possibilities for uneven aged partial cutting systems. In so doing, the company radically redefined and narrowed the approach to woodlot forestry first articulated in 1960.

The Department of Lands and Forests and Private Forest Management

Perhaps the most paradoxical element of the anti-WOA campaign involved the provincial Department of Lands and Forests. The state forest agency never demonstrated a consistent positive regard for woodlot forestry. This is particularly puzzling given that small woodlots (statistically defined as less than one thousand acres) constituted a full 60 per cent of forested lands, as opposed to only 23 per cent for crown lands and 17 per cent for large private holdings. It would seem inevitable that any comprehensive programme of forest improvement would necessarily be built around the woodlot sector, based on shared commitments to forest conservation and management. The discussion above makes clear that the incipient woodlot movement was so-inclined. It remains to trace the management philosophy of the state forest agency.

Early in the century, several professional foresters called, unsuccessfully, for a scientific approach to management. B.E. Fernow supervised the first ground survey of Nova Scotia forests in 1908, and urged a management initiative consistent with the Commission on Conservation.^{xxxii} Two decades later, Nova Scotia's Chief Forester, Otto Schierbeck, proposed a sustained yield strategy to curb the wanton degradation inflicted by high-grade loggers and portable sawmillers.^{xxxiii} Schierbeck discovered firsthand the political power wielded by rural brokers, as revolts by his staff of part-time forest rangers and by the cut and run mill men led to his firing in 1933. Nova Scotia's initial encounters with scientific forestry were distinctly negative, leaving the way clear for a politically sanctioned form of primitive forest exploitation.

The first piece of conservation legislation was the Small Tree Act of 1942. In an effort to protect young growing stock from premature harvest, it imposed a minimum "diameter-limit" of 12 inches for trees for commercial cutting. In response to rural pressure, the Act applied only to properties exceeding 1000 acres, thus effectively exempting the majority of forest lands. Ironically, the Nova Scotia forests were even more aggressively cut over during World War Two, yielding short term profits but long term forest quality decline. At a time when Royal Commissions advised Ontario and British Columbia on the need for comprehensive conservation management, Nova Scotia remained a generation behind. The deputy minister of Lands and Forests was a crown land administrator, and it was not until 1948 that a forester was again elevated to the top civil service position. By then, C.W.I. (Wilf) Creighton had learned the lessons of Schierbeck's demise. Over the next twenty years, he concentrated upon expanding the crown owned forest estate, which was far better insulated from rural political pressures.^{xxxiii}

Slowly and cautiously, Creighton expanded his department's professional cadre, recruiting more than a dozen degree foresters and other scientists by 1960. A Division of Forest Biology launched a vigorous research program into the birch die-back problem, while a Extension Division offered public education through touring displays and field-days. District Foresters administered cutting leases on crown lands, and planned demonstration management units and woodlots. Despite this incremental progress, it was far from the comprehensive forest management program proposed as early as 1944 by the Nova Scotia members of the Canadian Society of Forest Engineers.^{xxxiv} Put forward for federal consideration as a post-war reconstruction initiative, the report was reproduced in

the 1944 Lands and Forests Annual Report. This, unfortunately, proved to be the limit of the provincial government's enthusiasm.

One innovative research initiative belied the general backwardness of the post-war DLF. In 1951, the Forest Biology team turned to the study of tree growth and yield studies for the Acadian forest species of Nova Scotia. Led by forest entomologist Lloyd Hawboldt and Estonian emigre forester Simon Kostijukovits, field plots were laid out across the province in a variety of sites, where annual growth increments were measured, and normal tree height, age and volume data were compiled. From the outset this was a programme of applied research, aimed at generating tools for forest management and harvesting. Indeed the first experimental management plan was laid out in 1951 on the crown-owned Antrim Woodlot.

Soon this expertise was put to work in the massive Nova Scotia forest inventory of 1953-57. Made possible by the *Canada Forestry Act* (by which Ottawa shared the costs), this first modern scientific survey provided indispensable data for future forest planning. It combined aerial photography of the entire province with extensive ground cruising to establish basic stand characteristics. The summary report of 1958 identified the growing stock by species, volumes of standing timber, and growth rates. From this aggregate annual increments could be derived and allowable cut levels estimated. In short, the forest survey generated the indispensable data base on which to build a scientific management regime.

Yet even with the inventory, Hawboldt and Kostijukovits appreciated the immense distance separating the Department's modest crown leasing programme from full blown forest management. Any transition between the two had to be gradual and practical. As they put it in a 1961 report, "the immediate demand, with respect to the forest resources of Nova Scotia, is for a beginning in comprehensive management which should be simple, quick and inexpensive."^{xxxv}

The tools for such a program were set out in a series of technical bulletins released between 1960 and 1963. One essential was a standard for measuring trees under differing forest conditions on the ground. Tree volumes could be calculated from "height-class volume tables", which correlated height, diameter and volumes of solid wood. Tree growth and yield data could be calculated from "Site Quality Normal Yield tables", which correlated annual growth increments with site quality factors such as stand density (basal area per acre). It was here that Kostjukovit's contribution was crucial, in bringing European concepts to bear on measurement problems. While height-class volume is a static measurement in time, site quality normal yield is dynamic in estimating future growth trends, and from this gross and merchantable volumes. Armed with normal yield tables, the forester could move to the second element and conduct a "stand descriptive cruise" to record data on the ground. Combining the two, each stand (community of trees sharing certain uniformities) could be measured for management. A great virtue of these techniques was their simplicity and economy, in a setting where cost is a permanent constraint.

In their discussion of management, European concepts were again adapted to Nova Scotia conditions. The goal of management, ideally, was "the fully regulated forest, in which age classes are present in such proportion, and continuously growing at such rates, that an approximately equal annual yield of desired forest products may be sustained."^{xxxvi} The stand was the effective working unit and sustained yield was achieved by deriving management plans from the measured data. Harvest levels could be regulated on the basis of volume cut, or area cut. Hawboldt and Kostjukovits strongly favoured the latter, on grounds of simplicity of application. The total system was applied in prototype to produce management plans for the Antrim Woodlot (1961) and the Crystal Cliffs farm (1962). In 1963 it was applied to far larger blocs of crown land totalling 300,000 acres.

As innovative and timely as this approach, it incorporated several assumptions and corollaries which would have lasting implications. These centred upon the choice of silvicultural system by which management would be achieved. Recognizing both uneven aged and even aged management options, the DLF researchers opted strongly for the latter. This was based upon the levels of knowledge required, the speed of implementation, and the complexity of applications of the respective systems. An uneven aged stand was defined as one in which at least three age classes of trees were represented. Particularly in cases where mixed species were involved, uneven aged management implied a very high scientific threshold of scientific knowledge. Since the tree or groups of trees was the management unit, detailed scientific knowledge of both species silviculture and inventory control were necessary, and neither was readily available at that time in Nova Scotia. They argued that "altogether, the management requirements for forests of uneven aged stands appear too complex to develop and maintain for an area like Nova Scotia, where forest regulation is at minimal levels."^{xxxvii} On the other hand, management of even aged stands was much simpler. Not only could it be based on the rotation and age profile of the entire forest, but the stand was the (larger) operating unit and allowable cut could be set by area control. It also enabled full regulation over one rotation.

On even-aged stands, cutting could be accomplished by either the clearcutting or the shelterwood method. Where the former took off all the trees in a single treatment, the latter called for several stages of intermediate treatment before the removal cut, generating income and improved growth in the process. Both systems contrasted, however, with the selection system which marked individual trees for removal but never cleared the stand altogether. With approval, Hawboldt and Kostjukovits quoted Dana to the effect that the traditional homage to selection cutting was "biologically illiterate".

Another strong selling point for even aged management was its adaptability to all forest conditions. These ranged from far, woodlots of one or two acres to large industrial holdings. At the same time they conceded that uneven aged management in Europe is "commonly reserved for comparatively small management units, parks and farm woodlots."^{xxxviii} But despite its possible fit with such a large proportion of Nova Scotia tenures, on a system wide basis selection silviculture was deemed "too complex to develop and maintain."^{xxxix}

Although the DLF approach to forest regulation was presented as the integrated package described above, it was still possible to disaggregate the quantitative methodology and the cutting systems. In an invited critique of the Nova Scotia approach written in 1966, federal forester Alexander Jablanczy

thought the yield tables an important and essential forward step in improving management and management planning in Nova Scotia but warned that the rigid even-aged management of monocultures in central Europe was giving way to management of uneven-aged mixed stands by balancing cut against periodic increment.^{xi}

When the *Forest Improvement Act* was proclaimed in 1965 as the new Nova Scotia forest policy, it called for the publication of a "forest practices manual" to guide woods operations on crown and private land. To meet this need, Hawboldt compiled a new eighty page publication summarizing their collective work.^{xii} While it was another fifteen years before the manual appeared in print, under the title *The Trees Around Us*, it closely paralleled the Hawboldt report in key respects..

Similar to the cases of the WOA and NSPL above, it is the social ramifications of the DLF's technical perspective on silviculture that are most revealing. The first governing point is the growing division between planning for management and the execution of silvicultural programs. The disciplinary preserve of the forester included forest measurement (inventory and growth estimates) and formulation of harvest and reforestation plans. However the field operations involved in cutting and planting could be executed by corporate staff or independent contractors. While this had long been the practice on large commercial properties, it carried important new implications for small woodlot owners.

Conclusions

Did an epistemic community coalesce around the forest management and harvesting issue in Nova Scotia in the 1960s? The comparison of developments in the woodlot, industrial and state sectors suggests several points. Each of these estates developed a distinct approach to forest harvesting questions during the 1960s. Furthermore, each approach relied upon a set of scientific practices and principles to guide its programme. However their differing clienteles and developmental priorities led each sector to emphasize a separate dimension of management planning. Potentially, any of the three approaches could have underpinned a formal forest policy, individually or in combination. The pattern of developments sketched above makes clear that, however, that some threads were accorded greater recognition and support than were others.

To suggest that the epistemic community is one of professional foresters is to miss the crucial differences of emphasis which are possible within this domain. The

practitioners themselves recognize this diversity of tendencies in their use of descriptive labels such as "industrial" and "government" forester, "extension" and "field" forester, and "softwood" and "hardwood" forester. This connotes employer or clientele, site of principal activity, and object of attention within forestry practice. In this case, one of the most striking contrasts lies between the legitimacy accorded to industrial imperatives and the indifference or hostility displayed toward woodlot aspirations.

This is most evident in the allocation of state resources to forestry questions. After the comprehensive forest survey was completed in 1957, provincial authorities concentrated upon the management of the 25 per cent of forest lands in crown hands. By 1960 District Foresters were appointed in all parts of the province to this end. In addition, the vast crown holdings of eastern Nova Scotia had been leased to NSPL to supply its proposed mill. Yet the Extension forestry effort aimed at tens of thousands of small woodlots was late developing and poorly staffed. Five extension specialists were in place by 1965, with a general mandate for public education and supplementary product development. While all were available for woodlot consultation, none were specifically assigned to the woodlot constituency which was struggling to build a collective strategy. Nor was did a woodlot management program figure among the Extension Department initiatives which included Christmas tree development and blueberry husbandry. In fact, no extension forester was ever assigned to the Cape Breton region where NSPL concentrated its early logging activities.

The roots of this bias must be found in the commitments of forest sector leaders. Within the woodlot movement, Rev. Gillis never doubted that the top priority was getting sound scientific forestry knowledge to the people, who could put it to use. Furthermore St. F.X. forester Ellery Foster was convinced that scientific approach to resource management was fully compatible with the cooperative principles of social organization already rooted in rural society. Other institutional advocates read the situation differently. Key state officials in the DLF stressed the ignorance of rural producers or the difficulty of rendering complicated scientific knowledge to the grass roots. Corporate foresters were struck by the stone age methods and the peasant values which they perceived in smallholder resource use.

Haas's model of epistemic influence through the sequence of uncertainty -- interpretation --institutionalization assumes new significance in this case. Considerable consensus could be found around the sources of policy uncertainty. A heavily logged and degraded forest stood in need of revitalization. One of the most powerful spurs would come through increased commercial demand for wood products, which would induce owners and managers to systematically improve the state of the resource. However this early consensus dissolved when attention turned to interpretation of eligible strategies. Each institution advanced a distinct agenda in this regard. In retrospect this figures as the crucial phase of political resolution, for it was here that the industrial approach to silviculture prevailed over the alternatives. Though it was no more inherently scientific than the others, it had already emerged as the leading exponent of intensive silviculture. The state sector, which in theory recognized a plurality of approaches, accorded ready recognition to the clearcut approach while withholding anything like equivalent support

for the woodlot movement and its selection harvesting alternative. Not surprisingly, the institutionalization of a scientifically grounded clearcut management system followed relatively easily once the interpretative frame had been settled. Equally, this left the woodlot movement on the margin. Henceforth, its members frequently chose to withdraw from the market rather than acquiesce to the newly elevated orthodoxy they had unsuccessfully opposed.

ENDNOTES

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- ⁱ R.H. Burgess, "Forestry Incentive Programs for Increased Fibre Production in Nova Scotia", Office of the Deputy Minister, Department of Lands and Forests, talk to the Canadian Pulp and Paper Association, mimeo, 1970, p.4.
- ⁱⁱ Peter M. Haas, "Introduction: epistemic communities and international policy coordination", *International Organization*, 46:1, (Winter 1992), p.2.
- ⁱⁱⁱ Rev. J.A. Gillis, "The Nova Scotia Woodlot Owners Association: Some Facts on its Background and Program". n.d. but likely March 1960 (a press release following the founding meeting at Port Hawkesbury. St. F.X. Archives. RG30-3/14/555.
- ^{iv} J.A. Gillis, *Ibid.*, p.1.
- ^v M.M. Coady, "Forestry and Social Progress". RG30-3/14/255-61.
- ^{vi} J.H. Jenkins, "Importance of Research in Forest Products", and John R. Bigelow, "Better Utilization of Nova Scotia's Forests". RG30-3/14/168-78 and /201-07.
- ^{vii} Ellery Foster, "Forest Opportunities: Some Facts that Speak for Themselves". RG30-3/14/116.
- ^{viii} J.S. Bates, "The Forests - Potentially our Greatest Wealth". J.R. Bigelow, "Continuous Income Through Forest Management". RG30-3/14/155-62 and /190-200.
- ^{ix} The organizing group within the Extension Department adopted the following mandate: "In view of the haphazard manner the forest products have until now been handled and in order to give the woodlot owners a say in establishing a policy to be determined in the best interests of the forest industry, it is proposed to form the Nova Scotia Woodlot Owners Association." Rev. J. MacLeod, "Forestry in Nova Scotia". RG30-3/14/63.
- ^x "Proposed N.S. Woodlot Owners Association". Port Hood, 5 October 1959. RG30-3/14/571.
- ^{xi} Rev. J. MacLeod, "Forestry in Nova Scotia", Creignish, October 1959, p.4. RG30-1/14/63-67.
- ^{xii} *Ibid.*, 3.
- ^{xiii} Rev. J.A. Gillis, "The Importance of Woodlot Management", Nova Scotia Agricultural Conference, 6 January 1960. RG30-3/14/82.
- ^{xiv} "Woodlot Management". Transcript for *Life in These Maritimes*, 18 February 1960, 8pp. RG30-3/14/274-80.
- ^{xv} *Ibid.*, 3.
- ^{xvi} Ellery Foster, "Building from Below" *Houjan*, (India) 4 June 1955.
- ^{xvii} Ellery Foster, "Forest Opportunities: Some Facts that Speak for Themselves", August, 1958. RG30-3.14.116-128.

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- ^{xviii} Foster, "Needed Forestry Work in Nova Scotia and Who Might Do It", mimeo, n.d. RG30-1/14/707-08; "Toward a Co-operative Attack on Waste and Inefficiency in Forest Production in Eastern Nova Scotia, March, 1960, RG30-3/14/104-15.
- ^{xix} "Toward a Co-operative Attack", p.3.
- ^{xx} Foster to A.F. Byers, 23 March 1960. RG30-3/14/901.
- ^{xxi} J.A. Gillis, "The Nova Scotia Woodlot Owners' Association" March 1960, p.2. The first draft of these proposed objectives was set out the previous autumn when the Extension Department formalized its commitment. Only the sixth point was added after that time.
- ^{xxii} "Executive Meeting of Woodlot Owners Association", 9 May 1960. RG30-1/14/573.
- ^{xxiii} "Forestry Meeting", 4 September 1961. RG30-1/14/492.
- ^{xxiv} "Special Meeting", NSWOA, 20 December 1961. RG30-1/14/589.
- ^{xxv} NSWOA, *Newsletter*, December 1961, p.4/ RG30-3/14/651-56.
- ^{xxvi} Peter Clancy, "The Politics of Pulpwood Marketing in Nova Scotia, 1960-1985" in L. Anders Sandberg (ed.) *Trouble in the Woods*, Fredericton: Acadiensis Press, 1992.
- ^{xxvii} Hans G. Lindberg, "Nova Scotia Pulp Limited" n.d. but 1960, p.8. RG30-1/14/421-29.
- ^{xxviii} L.S. Hawboldt, "Forest Development in a Changing Economy", Halifax: Department of Lands and Forests, May 1965.
- ^{xxix} Nova Scotia Forest Industries Ltd., *The New Forest*, Gryksbo, Sweden, 1972, p.13.
- ^{xxx} Jan Weslien, "The Forest Improvement Act as Compared With European Legislation", Nova Scotia Section, Canadian Institute of Foresters, 10th Annual Meeting, September 1964, p.6.
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- ^{xxxvii} "Forest Regulation, Part III", p.3.
- ^{xxxviii} *Ibid.*, 3.

^{xxxix} "Mensuration for Management", p.7.

^{xl} E.L. Hughes to R.M. Bulmer, "Brief Critique of the Nova Scotia Yield Tables Contained in Bulletin No.20", June 1966, p.1.

^{xli} L.S. Hawboldt, *A Manual of Forest Practices For Nova Scotia*, Halifax: Department of Lands and Forests, January 1966.