

Sustainability and the Dis-integration of Conservation and Development in the Northwest Atlantic Fishery

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This paper begins with the premise that the sustainability debate is a recent, largely theoretical, discussion about conservation of the natural world. A second premise claims that there is a close similarity between the theory of sustainability and the resource management theory which informed the regulation of the Northwest Atlantic fishery. When the close similarity in theory is linked to a recognition that the practice of conservation in the fishery has failed catastrophically, there arises the possibility that the failure of the practice of conservation in the fishery can be a valuable case study for shedding light on the theory of sustainability.

Cet article débute avec les prémisses selon lesquelles le débat sur la durabilité s'avère une discussion récente, en grande partie théorique, sur la conservation du monde naturel. En outre, on note une similitude étroite entre la théorie de la durabilité et la théorie de l'aménagement des ressources guidant la réglementation de la pêche au nord-ouest de l'Atlantique. Lorsque cette similitude est liée à la reconnaissance du fait que la pratique de la conservation dans le domaine de la pêche a échoué de manière catastrophique, on peut avancer la possibilité que l'échec des pratiques de conservation dans la pêche pourrait servir de cas pertinent d'étude pour éclairer la théorie de la durabilité.

Despite the wealth of helpful theory, there have been very few success stories of fisheries management in practice.¹

Sustainability is an exceedingly recent and largely theoretical concept as applied to modern human exploitation levels of the natural world. This starting point is linked to a second proposition: the goals and strategies of conservation in Northwest Atlantic fisheries management literature and the goals and strategies of global sustainability literature are very similar. When this similarity in theoretical approach confronts the profound failure in the practice of conservation in the fishery, there arises the possibility that the fishery can be a valuable case study for assessing the goals and strategies of sustainability generally.

An examination of this failure points to a defining reality which confronts both resource management literature and sustainability literature: conservation initiatives do not regulate exploitation. Rather, unregulated development proceeds to the point of ecological collapse, and it is only in the aftermath of ecological collapse that conservation strategies are initiated. In the case of the Northwest Atlantic, the international distant water fleet – which expanded rapidly in the 1950s and 1960s – exploited the fish to the point of collapse in the early 1970s. Subsequent calls for regulation arose from a recognition of this initial calamity caused by uncontrolled exploitation, and were expressed most dramatically in the

declaration of 200-mile Exclusive Economic Zones by coastal states in 1977, the goal of which was to nationalize the context for regulation.

This reality of exploitation is profoundly at odds with the theory of conservation as represented in resource management and sustainability literature.² The goals of conservation in resource management and sustainability are two-fold: to assess the generative capacities of natural communities, and then to set exploitation levels within those capacities. When development to the point of collapse precedes conservation initiatives, the opposite is the case: generative capacities are difficult to establish because natural communities are in a state of flux due to over-exploitation, while the forces of development which caused the collapse are already in place and resist limitations by regulators.

More broadly speaking, conservation initiatives created in the aftermath of collapse are compromised by the fact that they are generated by the very institutional frameworks which promoted overexploitation in the first place, and which are therefore saturated with the edicts of development. Because of this “development mentality,” these institutions do not make the imperatives of exploitation sufficiently problematic when developing conservation initiatives.

In fact, the primary mandate of these institutions was and is to promote the most efficient use of resources; economic considerations were their central focus. Pollution and depletion were secondary considerations, and it is only in the last 30 years or so that conservation initiatives related to *valuing the non-economic* have become an important factor. The theory of resource management has therefore moved from the single-minded focus on economics to acknowledging the significance of such attributes as biodiversity, measurements of pollution levels and aesthetics. This transformation has generated a great deal of literature; whether it has altered the practice of resource management is another question.

Since the Canadian government declared the moratorium on fishing for northern cod on the Grand Banks in July 1992, after acknowledging that the cod were in a state of commercial and ecological collapse, attention has focused on seal predation, changing climatic conditions and foreign overfishing as possible causes for the economic and ecological crisis in the fishery. The overwhelming evidence is that, despite the range of approaches used to regulate the industry, ecological collapse was caused by the fact that too many fish went to market. As fishery scientists Jeffrey Hutchings and Ransom Myers state: “The temporal changes in demography, population stability, harvest rates, and inshore/offshore catch rates documented here provide strong evidence that overexploitation was the primary cause of the collapse of the northern cod in the early 1990s.”³ In an article entitled “The Managed Commercial Annihilation of Northern Cod,” Steele, Anderson and Green are equally unequivocal: “How did this [collapse] happen in an era of modern fisheries management? Much of the answer lies in the history of DFO procedures and management decisions.”⁴

Perspectives regarding the collapse in the fishery are closely associated with the range of interests present there. As a participant-observer in the fishery – I spent

12 years as an inshore fisherman and I still live in a coastal community on the south shore of Nova Scotia – I do not regard the possible partisanship of my social location as a limitation, but rather as a useful vantage point from which to view management decisions in the fishery and to challenge some assumptions about management that emanate from standard practice in a modern economy. If environmental problems are to be dealt with before rather than after ecological collapse, it may be necessary to find a way to discuss environmental problems that calls into question the structures and processes of modern everyday life more directly than is currently the case. As Rosemary Ommer states: “The realization is growing that consideration of fisheries management and science cannot be separated from the social context in which they operate.”⁵ The almost complete collapse of Canada’s east coast fishery raises questions about the viability of conservation initiatives at the level of the receding mandate of the nation-state, as it operates within the social context of an increasingly globalized economy.

Theories of Conservation and The Nationalization of Resource Management

... the Progressives assumed that lawmaking was somehow divorced from competition in the market place and not ... in many respects a struggle for resources carried on by other means.⁶

All the significant aspects of the relations between conservation and development are present in the history of regulation in the Northwest Atlantic fishery. First and foremost there is the full knowledge, recognized by all involved, that unregulated exploitation leads to ecological collapse. In the early 1970s, the international distant water fleet operated by the industrialized countries of the world exploited the fish in the Northwest Atlantic to the point of collapse. L.S. Parsons states:

The period 1958-1968 was one of dramatic, uncontrolled expansion in the Northwest Atlantic fisheries.... [The international fleet] engaged in what came to be known as “pulse fishing”: a large amount of fishing effort was directed at a particular species in a given area until it was reduced to a low level of abundance. Then the fleet moved on to another species or another area.... During this period the fishery diversified.... In addition to traditional groundfish species, the USSR developed fisheries for such species as Argentine, grenadiers, and silver hake. Canadian fishermen also diversified, with more intensive fishing of herring, redfish, flatfish and pollack.... In the area off the Canadian coast catches declined steadily from the 1968 peak of 2,700,000 tons to less than 1,500,000 tons in 1977.... The decline in catch did not fully reflect the extent of the decline in the stocks because of the continued increase in fishing effort until 1975.⁷

Attempts at regulation began in a nominal sense in 1949 with the creation of a voluntary, umbrella organization called the International Commission for the Northwest Atlantic Fishery (ICNAF) in the context of the expansion of the international distant water fleet after World War II. In the aftermath of the collapse of a

number of fisheries, various international plans were made to enforce gear and quota restrictions, but because ICNAF had no enforcement capability in the mid-1970s, these attempts to control exploitation failed.

Canada's contribution to the Law of the Sea Conference in 1974 stated: "... the Canadian Government considers customary international law inadequate to protect Canada's interest in the protection of the marine environment and its renewable resources."⁸ This inadequacy led directly to the declaration of the 200-mile Exclusive Economic Zones by the world's coastal states in 1977. The declaration was based on the claim that international law was insufficient to ensure conservation of marine ecology, and that depletion of marine communities could only be overcome by internalizing regulatory approaches within the circumscribed boundaries of the nation state. International open-access patterns were to be replaced by the "unified directing power" of the national mandate, which would provide both economic stability for domestic fleets and ecological stability for marine biotic communities.⁹ From the very beginning, this national mandate tried to integrate the perspectives of conservation and development, as they were later to be expressed in the sustainability debate.

To provide justification for the nationalizing of the high seas, the Canadian government set out its first comprehensive approach to the fishery on the eve of the declaration of the 200-mile limit. In the *Policy for Canada's Commercial Fisheries*, management goals were aimed at overcoming the chronic economic and ecological instability which had plagued the fishery in the international context. This new policy would:

- Obtain national control of the exploitation of fishery resources throughout a zone extending at least 200 nautical miles from Canada's coasts.
- Institute a co-ordinated research and administrative capability to control fishery resource use on an ecological basis and in accordance with the best interests (economic and social) of Canadian society.
- Develop a fully effective capability for the monitoring of information on resource and oceanic conditions, for the surveillance of fleet activity and for the enforcement of management regulations.¹⁰

There is therefore a very close relationship between the nationalization of the fishing grounds, for which this document served as a rationale, and the national mandate to put in place a comprehensive management framework.

It is worthwhile to compare Bruce Mitchell's normative model of the way resource management should take place with the above mission statement. Mitchell presents a resource management process whereby a "natural resource becomes a commodity or service as it is shaped by human attitudes, technology, financial and economic arrangements, and political realities." For Mitchell, this process should occur in three stages:

- 1) Resource Analysis – determines the quality, quantity, and availability, as well as demand for product.
- 2) Resource Planning – makes decisions which allocate and set the conditions of resource development.

3) Resource Development – manages the process whereby the resource becomes a commodity or service.¹¹

As well as presenting an ideal of the resource management process, Mitchell's model also provides an analytical tool for managers to assess the possible reasons for success or failure of particular instances of resource development.

The management goals set forth in *Policy for Canada's Commercial Fisheries* correspond to Mitchell's model. They are also in line with how earlier versions of sustainable development were presented in initiatives such as the *World Conservation Strategy*.¹² But while the theory of conservation involves a sequential process proceeding *towards exploitation*, the practice of conservation proceeds *from overexploitation*. Mitchell acknowledges this reversal when he states that the basis for making policy in resource management usually begins with the "identification of a significant problem, for which either there is no policy or else present policies are inadequate."¹³ The "identification of a significant problem" generally relates to overexploitation of a resource which, in turn, initiates the policy process. In the case of the *Policy for Canada's Commercial Fisheries*, conservation initiatives instituted in the aftermath of collapse failed to insure either economic or ecological viability.

Instead of leading to economic and ecological stability, the practice of conservation in the case of the fishery has led to depletion and dependence. Viewed from the perspective of artisan fishers in coastal communities, these realities are daunting, underwritten as they are by the recognition that regulation – as practised by the federal Department of Fisheries and Oceans – and exploitation represent two sides of a "development mentality" which undermined the viability of their way of life. Conservation initiatives executed at the level of the nation state, and working in conjunction with corporate interests in the fishery, amounted to little more than an enclosure movement which intensified exploitation and marginalized those who were not essential to that intensification of exploitation. In other words, national regulation and corporate priorities converged to undermine the position of coastal communities.

This threat has intensified in the form of the increasing privatization of the annual catch, which is being divided among the larger players in the fishery through Individual Transferable Quotas (ITQs). ITQs function as an industry-funded downsizing strategy, whereby the quota is privatized and divided up among the boats in a fleet sector rife with overcapacity. Because these individualized quotas are not enough for each boat to survive on, the owner either has to buy out his/her neighbour or be bought out. This privatization does not lessen the pressure on the fish – it merely promotes the concentration of the fleet in the direction of the larger players. Adding to this marginalization of the smaller players is the parallel process initiated in *The Atlantic Groundfish Strategy* (TAGS), which entreats them to leave the industry, thereby presenting a vision of a future fishery (if there is one) dominated by the participants most responsible for the current crisis.

This may seem like an excessively harsh assessment of the conflicting interests at work in the fishery. None the less, it underscores the fact that a great deal

of the analysis publicized by interests such as the federal Department of Fisheries and Oceans in the aftermath of the crisis amounts to little more than obfuscation and damage control, as blame is displaced onto foreigners, seals and cold water. More broadly speaking, the realities of depletion and dependence link Atlantic coastal communities with other marginalized local communities in both the northern and southern hemispheres: resources over which these communities have less and less control are exploited to the point of collapse, in direct contradiction to the theory of conservation. In the aftermath of collapse, the national mandate to provide any support is increasingly under threat because the necessary support networks are at odds with free trade and globalization. If the theory of conservation is based on this two-fold approach of ecological and economic stability, the practice of conservation in the fishery is rife with depletion and dependence, in which conservation – as represented in federal management regimes – and development – the intensification of commodity relations – are equally implicated.

The Political Economy of Depletion and Dependence

Although he was not directly concerned with depletion of natural communities nor with resource management or sustainability, Harold Innis's analysis of the cod fishery in 1940 suggests two reasons for ecological failure, linked to long-term historical realities in the Northwest Atlantic fishery. First, the history of international relations and colonial arrangements left Atlantic Canada in a state of dependence both economically and politically, and led to a set of development priorities for the fishery over which it had minimal control. Second, the expansion of commodity relations in the context of an increasingly industrialized fishery put intense pressure on marine biotic communities.¹⁴ It was these historical realities which – during the resource management mandate of the period from 1977 to 1992 – undermined the conservation goals set out by the Canadian government.

Rosemary Ommer links current problems with past history in a similar way: "... the roots of the current major issues in the inshore fishery, and of some of the problems of eastern Canadian regional underdevelopment, lie in the way the early merchant fishery was first established and conducted...."¹⁵ By recognizing the significance of the relations between natural processes and economic structures, and the relations that accompany various forms of production, Innis and Ommer present a perspective which is implicitly concerned with relationship between economics and ecology.

With regard to the relations between forces of technology and production, Barbara Neis states:

The Fordist relationship between capitalism and nature was based on seeking out, at a global level, large, dependable supplies of relatively homogeneous raw materials such as oil and wheat. In other words, Fordism relied heavily on direct and indirect control of such natural resources by large multinational corporations and relatively little knowledge about nature and on the efforts to transform nature....¹⁶

Neis also points out that a great many theorists who attempt to analyze the trans-

formation from Fordist large-scale industrial production such as the freezer trawler to post-Fordist approaches linked to flexible production “neglect the barriers to capital accumulation which nature imposes.”¹⁷ As Neis states, the failure to take natural barriers into account “contributed to the crisis in Fordism in the fishery and these have continued to hamper efforts to establish a new effective regime of accumulation, not only in the North Atlantic, but globally as well.”¹⁸

It is these two dominant realities of depletion and dependence which Canadian national management attempted to counter in its effort to create the opposite reality: ecological and economic stability. The question therefore arises: if depletion and dependence are the consequences of initial economic development in the fishery, what might be the strategies of conservation initiated to regulate them so as to promote economic and ecological stability? As stated earlier, the goals of conservation, as generally defined in resource management and sustainability theory, are two-fold: to assess the generative capacities of biological communities, and then attempt to insure that exploitation remains within those generative capacities. These goals are also clearly laid out in Canadian fisheries literature.

Economic Instability: From Common Property to Public Property to Private Property

As it developed the organizational infrastructure to manage the fishery on behalf of the people of Canada after the declaration of the 200-mile limit in 1977, the federal government was conscious of its responsibility both to conserve the fish and to foster orderly economic growth in the fishing industry. A complex web of regulations gradually evolved to control access to the fish, as well as a series of incentives for the development of the industry. It was hoped that with increased involvement in the fishery the federal government could increase the net benefit derived from the fish, both for those who participate in the industry and in general for the Canadian taxpayers who fund its regulation.

Throughout the 1977 to 1995 period of national management in the Northwest Atlantic, a gradual transformation in approaches to conservation came out of inquiries into breakdowns in the industry. Indeed, almost all fishery policy has been cobbled together by inquiries into the periodic and ongoing crises. As set out in *Policy for Canada's Commercial Fisheries*, management goals were initially defined in terms of putting in place a comprehensive regulatory framework that would control exploitation in the Northwest Atlantic. In time, the perception that this complex and expensive approach to management was having problems limiting exploitation joined the recognition that this comprehensive publicly funded national programme was benefiting fewer and fewer participants through limited-entry licensing and then through privatization of quota. Thus the national mandate for conservation which supported the claim to the 200-mile limit began to be questioned. As part of a wider governmental approach related to privatization, deregulation, and free trade in the mid-1980s, the fishing industry was to be further rationalized by granting larger participants private-property rights based on a percentage of the annual fish quotas, thereby lessening the need for comprehen-

sive management and lowering the tax burden on Canadians. At the same time, programmes focused on regional economic development which had used the fishery as an engine for job creation – and which were perceived to cause inefficiency in the industry – were now used to diversify the Atlantic economy away from the fishery.

Since the collapse of marine biotic communities in the early 1970s and the various regulatory responses to that collapse (including nationalizing the fishing grounds), resource managers have been attempting to control exploitation and at the same time trying to understand the workings of marine biotic communities destabilized by overexploitation. Thus these policies reflect not the fulfilling of the twin mandates of ecological and economic stability, but rather the sacrifice of conservation policy to assuage the cries for more fish. This crisis management approach is understandable within the context of historic dependence in Atlantic Canada. Colonial dependence led the fishing industry to be seen, in the period immediately following the nationalization of the coastal zone, as an engine of jobs and economic activity when, in fact, it had been made very vulnerable by the over-exploitation of the international fleet.

This policy of using the fishery as the engine of development to overcome regional disparity within Canada was most conspicuous in the expansion of the catching and processing capacity of the larger fish companies, subsidized by agencies such as the Department of Regional Economic Expansion. Gene Barrett sums up the history of the relationship between government and large fish companies such as National Sea Products in this way:

The history of National Sea Products is one of growth and expansion under the protective wing of a developmentist state, especially in the 1970s. In payment for this public tutelage, the company took advantage of every opportunity to exploit underutilized species or new species of fish, and to expand efforts into more traditional fisheries. Centralism, concentration, and technological modernization became its hallmarks. In spite of this seeming orderly expansion, however, anarchy and frenzied overexploitation prevailed. When fish stocks were threatened, the company could only respond by increasing efforts in other areas or by diverting capital out of the fishery or out of the country altogether. To such an organization, conservation and rational management were an anathema.¹⁹

When the recession of the early 1980s set in, this expansion caused a debt and liquidity crisis in the recently expanded fish companies, which had huge stockpiles of inventory they could not sell. This crisis led the federal government to set up the Kirby Task Force to inquire into the problems in the fishery; the task force report clearly identified the Canadian government's internally contradictory response to fishery issues after the declaration of the 200-mile limit in 1977: "While the Department of Fisheries and Oceans was slowly tightening up the licensing regime with one hand (and preaching constraint), it was passing out subsidies for fishing vessel construction with the other, as were provincial loan

boards.”²⁰ One of the most important outcomes of the Kirby Task Force was the amalgamation of a series of financially troubled fish companies into large vertically integrated companies, such as Fisheries Products International in Newfoundland and National Sea Products in Nova Scotia. Through a massive infusion of capital, the Canadian government set about creating a “modern” industry that would overcome the backwardness and poverty of the past. The priorities of large industry began to dominate fishery policy in official terms, and this led to comprehensive regulatory frameworks gradually being replaced by privatization of fish quota, beginning with the larger players in the industry.

This drive for economic development led to a situation where, by 1981, the domestic Canadian fleet surpassed the catching capacity of the international fleet which had decimated marine communities in the 1970s. Despite its massive expenditure on regulatory infrastructure, the Canadian government ended up doing little more than reproducing the very processes of industrial expansion which had destroyed the marine communities in the international context. Because of the expansion of the Canadian fleet, catch levels increased throughout the early 1980s and levelled off in the mid-1980s before beginning to drop dramatically. Prices paid for fish were at an all-time high in the mid-1980s, so despite falling catches the increased value promoted exploitation of marine communities which were on the brink of collapse. In the aftermath of collapse, it became clear that the fish had already been in a vulnerable state. It was only the increased efficiency and catching capacity of the Canadian fleet, and not the recovery of the health of marine communities, which generated increased catches.

In 1989, the *Scotia-Fundy Groundfish Task Force Report* – an inquiry into overcapacity in the groundfish fleet – stated that the fleet had five times the capacity needed to catch the annual quota. Along with the recognition of overcapacity in the fleet, the report reflects a fundamental change in the federal government’s approach to the fishery. In contrast to *Policy for Canada’s Commercial Fisheries*, which saw its mandate in terms of putting in place a centralized and publicly-funded regulatory infrastructure to manage the fishery, the 1989 report was more interested in the wider government initiative linked to privatization and deregulation of economic activity:

Fisheries management employs public resources to generate private gain. The process should be made as efficient as possible to minimize the cost to Canadian taxpayers. Management has evolved toward a system demanding a high degree of administrative, scientific, and enforcement support while manpower and financial resources have been declining. In this light more efficient management measures must be sought.²¹

A central aspect of this increased efficiency was the expansion of the Enterprise Allocation programme, which turned the fish in the ocean into transferable private property in the form of ownership of a share of the annual Total Allowable Catch granted to the larger participants in the industry. This approach assumed that private property promoted more rational use of the resource, as opposed to the “rush to fish” impetus which was inherent in the quota system.

As it gradually became clear in the late 1980s that the regulatory mandate set out in *Policy for Canada's Commercial Fisheries* had failed, the federal Department of Fisheries and Oceans abandoned the mandate of a comprehensive regulatory infrastructure funded by Canadian taxpayers. By beginning a programme to privatize and deregulate the fishery, the Canadian government acknowledged that it had manifestly failed to fulfil the goals of promoting ecological and economic stability in Atlantic Canada, goals which had formed the basis of their declaration of the 200-mile limit. In moving toward privatization and the more recent "partnership program" which would allow large companies to contract out the catching of their privately-held share of the quota to foreign fleets, the Canadian government is promoting the global processes which have depleted biotic communities, while increasing the vulnerability of Atlantic coastal communities. As the Southwest Nova Fixed Gear Association, made up of inshore longline fishers, argued in 1995: "Despite their admitted mismanagement, the 'managers' continue to defend their capability to reform their own department, the management process, and the industry. Those of us who have endured the pain of past mistakes have little faith that they will resolve problems they haven't grasped."²²

In a deeper sense, the mismanagement is not so much about "past mistakes" as it is about a concerted and ongoing policy approach which has rewarded those participants in the industry who are most responsible for the present ecological and economic crisis, and who are none the less becoming more powerful, albeit as masters of disaster.

Ecological Instability: Fishery Science in the Northwest Atlantic

... I'm willing to go so far as to say the forecasting tools at the foundation of the scientific-rational basis of industrial society are all biased in the same dangerous way.... And none of us are seeing the problem, let alone dealing with it.²³

Because of significant disparities in the perceived health of marine biotic communities, emerging in the late 1980s from different modelling techniques used to set catch levels, DFO set up a panel to look into the quality of Canada's stock assessment models. In an interim report prepared in 1990 for the federal Minister of Fisheries and Oceans, Leslie Harris – at the time President of Memorial University and a historian – described the short-term goals of the panel he was chairing:

... the Panel focused its attention upon the suitability of the mathematical modelling techniques employed by DFO scientists, a preliminary examination of the quality of the data inputs into the model, an assessment of the appropriateness of the management advice that has been offered to the Minister, and the identification of some interim measures that might assist in improving the reliability of advice for 1990 and beyond.²⁴

Along with the many other social and economic problems that have plagued the Northwest Atlantic fishery, the very basic but difficult question of how many fish were there to catch always remained an unknown factor that threatened the viability of the industry. In no uncertain terms, Harris stated: "the Panel is persuaded

that there has been a serious underestimation of fishing mortality rates in the years between 1977 and 1989.”²⁵ This resulted in a Total Allowable Catch set at double what it should have been and necessitated, as Harris argued in 1989, large cutbacks in order to insure the survival of the northern cod. Although Harris’s advice was resisted at the time by the Minister of Fisheries and Oceans, the state of the cod turned out to be even worse than the Harris Report had estimated it to be.

This failure to assess the size of biotic communities correctly is in direct contradiction to the Canadian government’s intention in declaring the 200-mile limit, as presented in *Policy For Canada’s Commercial Fisheries* (1976): “Institute a coordinated research and administrative capability to control fishery resource use on an ecological basis and in accordance with the best interest (economic and social) of Canadian society.”²⁶ A.C. Finlayson presents the problem identified by the Harris Report in this way:

In the current atmosphere of social, economic, and environmental crisis, everyone with an interest in the fishery is searching for the reason for this latest failure.... [V]oices in all sectors of the fishing industry – the federal management structure, the media, and the general public – suggest that, even given other (contributing) factors, science, the erstwhile “saviour,” is not the solution but part of the problem.²⁷

This perception of fishery science as “part of the problem” runs counter to the perspective which underwrote Canada’s claim to the Northwest Atlantic. As Finlayson states: “Canadian scientists believed that the theory of fish population dynamics was reasonably well understood. What had prevented rational, sustainable management in the past had been lack of authority, control and resources. Now they had all three.”²⁸ It is this same kind of claim to “authority, control, and resources” which underpins many current sustainability strategies concerned with environmental problems. This claim has been seriously questioned by Ludwig, Hilborn and Walters, who argue that there has been a “remarkable consistency” in the fact that “resources are inevitably overexploited, often to the point of collapse or extinction” for the following reasons:

(i) Wealth or the prospect of wealth generates political and social power that is used to promote unlimited exploitation of resources. (ii) Scientific understanding and consensus is hampered by the lack of control and replicates, so that each new problem involves learning about a new system. (iii) The complexity of the underlying biological and physical systems precludes a reductionist approach to management. Optimum levels of exploitation must be determined by trial and error. (iv) Large levels of natural variability mask the effects of overexploitation. Initial overexploitation is not detectable until it is severe and often irreversible.²⁹

Conservation in the fishery, and sustainability initiatives generally, by their very definition require a prescribed level of exploitation. The role of biologists involved in conservation or sustainability initiatives is to supply that number. The message seems to be, in effect, “here is the principle, and here is the interest, in nature – so exploit to here and stop; this natural sink can absorb this many toxins – so pollute

to here and stop.” These are entirely human concerns, most often entirely economic concerns, and have little to do with interactions in natural communities. As Leslie Harris states:

The danger in all modelling, in my view, is that you become trapped by it to some extent. It’s self-fulfilling. You’re dealing with data which are manipulable and variable and uncertain. You have a variety of ways that you can interpret the data. If you’ve got a model that you believe in you will interpret the data in a way that makes the model work. I don’t think there’s any dishonesty in this, as such....³⁰

We assume that if we know nature well enough, have good enough data, and good enough models of natural interactions, that the magic number related to sustainable levels of exploitation or pollution will appear. But that number is nowhere to be found in nature, and is in fact a profoundly impoverished expectation required by the priorities of the balance sheet.

Mathematical models for assessing the size of biotic communities in the Northwest Atlantic began with the Maximum Sustainable Yield production models, based on the relationship between catch and fishing effort, which were used by the International Commission for the Northwest Atlantic Fisheries (ICNAF). Following the declaration of the 200-mile limit, Canada retained the same assumptions as production models but established more conservative catch levels. As well, Canadian fishery scientists developed forms of analysis based on the age classes in the fish population which, in conjunction with research vessel information, gave a more detailed understanding of the complexity of the marine environment and lessened reliance on commercial catch data.

Despite these improvements in stock assessment models, Harris argued that there were serious problems not only with the attempt to assess accurately fish population, but also with the economic and institutional context in which this project existed:

Perhaps it is easier, and therefore, more tempting, to seek answers through mathematical manipulations, whereas, the true solution may only become apparent when we have a more comprehensive knowledge of the biology and behavioral characteristics of the species with which we are particularly concerned and of the ecosystem in which it functions.³¹

Brinkmanship with the limits of natural processes in withstanding exploitation forms the basis of the production model of nature. The more pervasive the edicts of economic development and exploitation are in a society, the more central are the views of nature in productive terms, both because of the increased importance of the mindset of development and also because natural processes are exploited to their limits and require attention if economic outputs are to be maintained.

In 1954, Scott Gordon stated that “the present state of knowledge is that a great deal is known about the biology of the various commercial species....” Given the recent machinations involving the state of the accuracy of fishery science predictions, this is an interesting statement of confidence in the fishery science of 40 years ago. It becomes increasingly more interesting if we accept that Gordon’s statement

was true at the time. In other words, what is different now is the expectations of fishery science. In the context of ecological brinkmanship, the only important knowledge is that which guides exploitation along the cliff-edge of collapse. Only when this is not the primary requirement – as it was not in Gordon’s time when the ocean was considered infinite – is it possible to make such a statement.

This kind of transformation is evident in the forces exerted on biological science in the Northwest Atlantic in the 1960s. As fishery scientist Edward Sandeman, then Director of the Science Branch for Canada, states:

It was during this period that the focus of fisheries science changed to a mathematical approach and the modern science of fishery population dynamics really took off. This was really quite a difficult time for those in fishery science because they were neither trained nor even had an aptitude for this new discipline.

Fishery scientists of that era were trained to taxonomy and the microscope, and it was a very difficult challenge to change from biology to mathematics.... The push didn’t really develop until 1970 when most of the ICNAF community started to realize that there were problems. That gross over-fishing was taking place.... And I guess really that’s when our scientists were forced to become much more mathematically oriented, and to use the tools of population dynamics.³²

From Sandeman’s comments we see that a corresponding transformation in economic activity associated with exploitation of the fish was accompanied by the emergence of forms of production-oriented knowledge. This resulted in the false perception of commonality between science and economics, as expressed more recently by fishery scientist J.J. Maguire: “If we want to stay in business we better get closer to the clients [commercial industry]. It’s straight free-market economic forces.”³³ This turns fishery science, through the lens of management decisions, into a kind of service sector providing information about the availability of raw material to industry so that it can do long-term financial planning.

As the biological perspective of “taxonomy and the microscope” was gradually captured by large-scale industrial assumptions, the perspective of small-scale inshore fishing people was increasingly marginalized. To quote Sandeman:

For the most part the majority of them [inshore fishers] have a litany of mumbo jumbo which they bring forth each time you talk to them. About where the fish are and why they’re not here. They relate it to things like the berries on the trees.... When I was going around trying to understand a bit more about Newfoundland and the fishery, I just got completely turned off by the inshore fishermen and their views. Because they were totally unscientific!³⁴

This marginalization of knowledge derived from inshore perspectives, or should I say from community perspectives, mirrors the marginalization of this group in the policy process, as well as in terms of the industrial claim to the fish in the Northwest Atlantic. What is clear here is that any concept of community, whether of inshore coastal human communities or of marine biotic communities (or their

interrelations), became anathema to the priorities of a rapidly industrializing fishery. Appropriate knowledge was conceived of in terms of development and production and, by its very definition, promoted ecological uncertainty.

The Practice of Conservation: Solving Problems or Solving History?

Unlike political economy critiques of capital and markets which struggle “to find a frame of reference to which the market itself is referable,” to quote Karl Polanyi, the critical ability of many sustainability perspectives is limited by their implicit acceptance of the workings of the modern economy.³⁵ As McEvoy states with regard to the limited mandate of resource management in the California fishery: “... external to the theory [of resource management] were the forces that drove the harvest: demand, technology, and other variables were factors that fishery managers had to cope with, but were not variables to be controlled.”³⁶ These are precisely the forces of demand and technology which political economists identify as central to understanding the predatory relationship between economic processes and natural processes. As Wolfgang Sachs explains the resistance to significant analysis of environmental problems in the sustainability debate:

Reaffirming the centrality of “development” in the international discussion on the environment surely helps to secure the collaboration of the dominating actors in government, economy, and science, but it prevents the rupture required to head off the multifaceted dangers for the future of mankind. It locks the perception of the ecological predicament into the very world view which stimulates the pernicious dynamics, and hands the action over to those social forces – governments, agencies, corporations – which have largely been responsible for the present state of affairs.³⁷

The “present state of affairs” is general woe in the Northwest Atlantic. But despite the catastrophe which has befallen the fishery, those responsible for it remain in charge, attacking the Spanish foreigner, and engaging in high seas conflict and confrontation.

The “wealth of helpful theory” referred to by Pitcher and Hart, in the form of the resource management perspectives under which the Department of Fisheries and Oceans operated, was rendered inoperable by an implicit acceptance of the processes of modern economy which had promoted depletion of marine communities and dependence in Atlantic human communities. Fishery managers could not or would not acknowledge the “financial vortex” which undermined any conservation initiatives. Instead, managers saw the problems in the fishery in terms of its “poor fit” into modern economic categories.

What the “race for quota” really refers to is not the common property problem, but the location of conservation – as it operates in a quota system – within modern political economy. Conservation is not an on/off switch for destructive behaviour imposed by an external authority at some upper level of exploitation at the last minute. In other words, to allow all the workings of modern technology and economic pressure, and then to expect all this to grind to a halt when catch levels

are reached, is the analytical equivalent of solving waste management problems by standing at the gate of the landfill site with a whistle. Alternately, a viable conception of conservation may require an implicit recognition of membership in both human community and natural community. Conservation is therefore a social and cultural project, rather than a regulatory problem. As David Ralph Matthews states:

... the link between commons and community is not only structural, but also symbolic.... [I]t is clear that scholarly attention needs to be directed to the socio-psychological dimensions of such reconstructions of meaning. That analysis should focus on the identification with and commitment to community.³⁸

If the political economy of depletion and dependence is seen as being a significant perspective in understanding the destruction of marine biotic communities in the Northwest Atlantic, it becomes even more significant when viewed in the context of the trend toward economic globalization. The marginalization of peripheries such as Atlantic coastal communities is exacerbated by perspectives in which any mandate other than that which suits the community of capital becomes inefficient and irrational. From the perspective of Atlantic coastal communities, interests from the centre exploited the natural processes on which they depend to the point of collapse, leaving these communities vulnerable to forces over which they have no control. With the shrivelling mandate to implement remedial support, such as unemployment insurance in the Canadian context, these communities have nothing with which to bargain, at the same time as economic interests look elsewhere for profit. This state of vulnerability and marginalization is sure to generate social and political strife in the future. The “focus on conservation” of resource management and sustainability has done little to mitigate this process, and has in fact amounted to little more than an enclosure movement in which those who were not essential to the rationalization process were marginalized.

The Northwest Atlantic Fishery and the Sustainability Debate

In the *State of the World 1995*, Lester Brown asserts that when “sustainable yield thresholds are crossed, the traditional responses proposed by economists no longer work.”³⁹ Policy instruments, such as the internalizing of externalities, pollution permits, effluent taxes, voluntary regulation – instruments which dominate current sustainability discussions – are eclipsed by increasingly unstable social and political realities. After taking part in the negotiations which led up to the United Nations Conference on Environment and Development (the “Earth Summit”) in 1992, Pratap Chatterjee and Matthais Finger concluded that, “As a result of the whole UNCED process, the planet was going to be worse off, not better” and that “the outcome is a new push for more environmentally destructive industrial development.”⁴⁰ Most of the analysis of the problems in the fishery which has occurred in the aftermath of collapse reflects a similar failure to come to terms with the destructive aspects of industrial development.

This accommodation of development by conservation perspectives is conveyed in the definitions of conservation and development in the *World Conservation Strategy*:

Development is defined here as: the modification of the biosphere and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of life....

Conservation is defined here as: the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.⁴¹

Because this conception of development is so benign – what could be more reasonable than improving the quality of life? – the correspondingly phlegmatic conception of conservation need not be very demanding. *Caring for the Earth* – the 1991 update of the *World Conservation Strategy* – reflects a similar accommodation, while acknowledging that there are problems with certain kinds of development:

We need development that is both people-centred, concentrating on improving the human condition, and conservation-based, maintaining the variety and productivity of nature. We need to stop talking about conservation and development as if they were in opposition, and recognize that they are essential parts of one indispensable process.⁴²

The events that have taken place in the Northwest Atlantic fishery challenge this conception of the relationship between conservation and development. When *Caring for the Earth* states that “we need development that is both people centred ... and conservation-based” it is saying that modern development is not people-centred or conservation-based. As opposed to the entreaties in *Caring for the Earth* to “stop talking about conservation and development as if they were in opposition,” it may be that an oppositional sense of conservation resisting development is precisely what is required. Conservation requires a far more antagonistic counter-movement to the forces of development if it is going to resist the pressure of capital theory.

It is the destruction of fish species, and the accompanying vulnerability of the human communities depending on them, which underlies the “Turbot War” that took place in the spring of 1995 between Canada and Spain. The high-seas confrontations just outside Canada’s 200-mile limit reflect the internally contradictory relationship between conservation and development which appears in the aftermath of ecological collapse. There is every indication that “environmental war” is becoming an increasingly common response to ecological failure, not only in the oceans, but in a variety of milieus. Ecological breakdown therefore becomes a precondition to social and political breakdown. So environmental problems are becoming increasingly complex not only because they interact in biophysical terms, but also because they create instability in the larger societal context. Once the world of ecological viability is entered, there is no easy road back to social and economic viability.

NOTES

1. T. Pitcher and P. Hart, *Fisheries Ecology* (London: Croom Helm, 1982) 344.
2. These issues are discussed at greater length in my book: *The Oceans Are Emptying: Fish Wars and Sustainability* (Montreal: Black Rose Books, 1995). Other useful articles are contained in *Ecological Applications* 3 (4), 1993, as well as a special issue of *The Ecologist* 2/3, 1995.
3. Jeffrey A. Hutchings and Ransom A. Myers, "What Can Be Learned from the Collapse of a Renewable Resource?: Atlantic Cod, *Gadus morhua*, of Newfoundland and Labrador," *Canadian Journal of Fisheries and Aquatic Sciences* 51, 1994, 2144.
4. D.H. Steele, R. Anderson, and J.M. Green, "The Managed Commercial Annihilation of Northern Cod," *Newfoundland Studies* 8 (1), 1992, 34.
5. Rosemary E. Ommer, "Fisheries Policy and the Survival of Fishing Communities in Eastern Canada," *Deep Water Fisheries of the North Atlantic Oceanic Slope*, A. G. Hopper ed., Proc. NATO Adv. Res. Workshop, (Dordrecht: Kluwer Academic Publishers, 1995) 1.
6. Arthur McEvoy, "Toward an Interactive Theory of Nature and Culture: Ecology, Production, and Cognition in the California Fishing Industry," *Environmental Review* 11 (4), 1987, 295.
7. L. S. Parsons, *Management of Marine Fisheries in Canada* (Ottawa: National Research Council, 1993) 228-29. See also D. A. Pepper, *Men, Boats, Fish in the Northwest Atlantic* (Cardiff: Dept. of Maritime Studies, Univ. of Wales, 1978).
8. *Law of the Sea Discussion Paper* (Ottawa: Dept. of External Affairs, 1974) 3.
9. H. Scott Gordon, "The Economic Theory of the Common Property Resource: The Fishery," *Journal of Canadian Political Economy* 62, 1954, 135.
10. Fisheries and Marine Service, *Policy for Canada's Commercial Fisheries* (Ottawa: Dept. of the Environment, 1976) 63-4.
11. Bruce Mitchell, *Geography and Resource Analysis* (New York: Longman & Wiley, 1989) 3-5.
12. *World Conservation Strategy* (Gland: UNESCO, FAO, and IUCN) Section 7.
13. Mitchell, *op. cit.*, 6.
14. Harold Innis, *The Cod Fishery: A History of An International Economy* (Toronto: University of Toronto Press, 1940).
15. Rosemary Ommer, *From Outpost to Outport: A Structural Analysis of the Jersey-Gaspé Cod Fishery, 1767-1886* (Montreal and Kingston: McGill-Queen's University Press, 1991) 3.
16. Barbara Neis, "Flexible Specialization: What's That Got To Do with the Price of Fish?" in *Production, Space, Identity: Political Economy Faces the 21st Century*, Jane Jenson, Rianne Mahon, and Manfred Bienefeld eds., (Toronto: Canadian Scholars Press Inc., 1993) 90.
17. *Ibid.*, 88.
18. *Ibid.*, 102.
19. Gene Barrett, "Capital and the State in Atlantic Canada: The Structural Context of Fishery Policy Between 1939 and 1977," *Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies*, Cynthia Lamson and Arthur Hanson eds., (Halifax: Dalhousie Ocean Studies Programme, 1984) 96.
20. Michael J.L. Kirby, *Navigating Troubled Waters: Report for the Task Force on the Atlantic Fisheries* (Ottawa: Minister of Supply and Services, 1983) 20.
21. Jean Hache, *Scotia-Fundy Groundfish Task Force Report* (Ottawa: Minister of Supply and Services, 1989) 10.
22. Southwest Nova Fixed Gear Association, *The Canadian Maritimes Fishery: Let's Fix It*, 1995, 13.
23. Jake Rice quoted in Alan Christopher Finlayson, *Fishing for Truth: A Sociological Analysis of Northern Cod Stock Assessment from 1977 to 1990* (St. John's: Institute of Social and Economic Research, 1994) 149.
24. Leslie Harris, *Independent Review of the State of the Northern Cod Stock* (Ottawa: Minister of Supply and Services, [Interim Report. 1989, Final Report. 1990] ii).
25. *Ibid.*, ii.
26. Fisheries and Marine Service, *Policy For Canada's Commercial Fisheries*, 63.
27. Finlayson, *op. cit.*, 6.
28. *Ibid.*, 24.
29. Donald Ludwig, Ray Hilborn, and Carl Walters, "Uncertainty, Resource Exploitation, and Conservation: Lessons from History," *Science* 260, 2 April 1993, 17.

30. Leslie Harris quoted in Finlayson, *op. cit.*, 69.
31. Harris, *op. cit.*, 35-6.
32. Edward Sandeman quoted in Finlayson, *op.cit.*, 85-6.
33. J. J. Maguire quoted in Finlayson, *op. cit.*, 97.
34. Edward Sandeman quoted in Finlayson, *op. cit.*, 110.
35. Karl Polanyi, *Primitive, Archaic and Modern Economies*, George Dalton ed. (New York: Doubleday Anchor, 1968) 174.
36. Arthur McEvoy, *op. cit.*, 295.
37. Wolfgang Sachs, "Global Ecology and the Shadow of 'Development'," *Global Ecology* (London: Zed Books, 1993) 3-4.
38. David Ralph Matthews, *Controlling Common Property: Regulating Canada's East Coast Fishery* (Toronto: University of Toronto Press, 1993) 94.
39. Lester Brown, *The State of the World* (New York: Norton, 1995) 15.
40. Pratrapp Chatterjee and Matthais Finger, *The Earth Brokers* (New York: Routledge, 1994) 2.
41. *World Conservation Strategy* (1980: Section 1).
42. *Caring for the Earth* (Gland: IUCN, UNEP, and WWF, 1991) 8.

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