



**IT IS *FARMING*, NOT FISHING:
Why Bureaucrats and Environmentalists
Miss the Point of Canadian Aquaculture**

ROBIN NEILL

How to Farm the Seas (Paper #4)

Brian Lee Crowley, Gerry Johnson
Series Editors

April 2006

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2000 Barrington Street, Suite 1006
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Telephone: (902) 429-1143

Fax: (902) 425-1393

E-mail: aims@aims.ca

Web site: www.aims.ca

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ABOUT THE AUTHOR

Robin Neill is Chairman of the Board of Research Advisors, Atlantic Institute for Market Studies, and Adjunct Professor of Economics at the University of Prince Edward Island and Carleton University.

Born in 1931 in Thunder Bay, Ontario, Professor Neill holds a BA and MA in Political Economy from the University of Toronto and a PhD in Economics from Duke University. His academic appointments include: University of Saskatchewan, 1960–69; University of Prince Edward Island, 1970–72; Carleton University, 1972–95 (retired as Full Professor); University of Prince Edward Island and Carleton University, Adjunct Professor, 1995–98. He was Special Advisor to the Fisheries Council of Canada and the Department of Fisheries and Oceans, 1984–85.

Professor Neill's publications include *A New Theory of Value: The Canadian Economics of H.A. Innis* (University of Toronto Press, 1972); *A History of Canadian Economic Thought* (Routledge, 1991); *Fencing the Last Frontier: The Case for Property Rights in Canadian Aquaculture* (AIMS, 2003); and numerous articles in scholarly journals and other contracted studies and papers. His research interests are the history of economic development and policy in Canada and the history of economic thought.

EXECUTIVE SUMMARY

The growth of aquaculture in Canada, while steady, has not been as strong as one might expect, given the enormous length of this country's coastline and the world-class expertise in fish farming that exists here. In part, aquaculture has grown slowly because, historically, wild fish were so abundant in Canada's coastal waters. With the depletion of wild fish stocks and Canada's declaration of sovereignty over a 200-mile economic offshore exploitation zone, attention has slowly turned to farmed fish as an alternative source of supply. Yet the industry remains severely hampered by institutional obstacles.

Perhaps the most important of these obstacles is an antique system of property rights that makes no distinction between wild fish that are gathered in the open ocean and those that are farmed. The result is that fish farming is overseen by the same federal government department, Fisheries and Oceans (DFO), that also governs the wild fishery, instead of by a department such as Agriculture, where it more properly belongs. As one critic put it, the government's oversight of aquaculture is analogous to "a chicken farm being managed by the Migratory Birds Act." It also means that bureaucrats within DFO, a department that grew up in relation to the wild fishery, lack the scientific expertise to determine what is best for the aquaculture industry.

The second obstacle to the growth of aquaculture is the nature of government in Canada. The minister in charge of the department that oversees aquaculture is, like all politicians, highly motivated by political concerns — particularly the desire to be re-elected. Accordingly, he or she is vulnerable to pressure from special interest groups that do not necessarily have the interests of the aquaculture industry at heart. Indeed, such groups may be actively hostile to fish farming, and the campaigns they wage against it have a deleterious effect on aquaculture policy.

The third serious obstacle is that aquaculture has expanded in an era when environmental activists, fearful of the possible exhaustion of the planet's resources through overuse, have acquired considerable influence on politicians as well as prominence in the media, with attendant effects on an otherwise uninformed public opinion. Furthermore, the Law of Institutional Immortality states that, when problems are not solved, pressure groups working toward their solution grow in size and organizational complexity. Indeed, if problems were solved, such institutions would have no reason to exist. Thus, in the case of aquaculture, no matter what fish farmers do to keep their stocks healthy, environmental activists point to their use of veterinary drugs and to the presence of miniscule amounts of pollutants to charge that farmed fish are dangerous.

The solution to the problems that Canadian aquaculture faces involves three strategies. First, establish the same private property rights in aquaculture that exist in agriculture. That means giving the



fish farmer ownership of the means of production and exclusive right to the profit gained from the farmer's use of those means. If outright ownership is not possible, the alternative should be to issue leases and licences for a sufficient length of time to encourage investment in water quality, equipment, and fish health in general.

Second, separate government oversight of aquaculture from that of the wild fisheries. Ideally, this would involve creating a separate, fully competent independent government agency to regulate and support aquaculture. A less comprehensive alternative would be to create an independent unit within the Department of Agriculture.

Third, replace politicized decisionmaking with objective cost-benefit analysis in disputes concerning aquaculture. Bureaucrats and politicians, under pressure from environmental activists, apply the precautionary principle to the point of paralysing decisionmaking within DFO. Instead, an institutionalized, economics-based process, independent of any competing special interest, should objectively analyse and inform both the bureaucracy and the courts about the development effects of their decisions with respect to fish farming.

INTRODUCTION

Fish farming has grown in Canada at about the same rate as in most other countries (China, Chile, and Norway are exceptions). Yet, with its thousands of miles of shoreline and sufficient expertise in aquaculture to export its knowledge abroad, Canada is not even in the top ten producers of farmed fish (see Table 1). What accounts for this remarkable state of affairs?

Table 1: *Major World Aquaculture Producers, 2002*

	Volume	Growth Rate
	(thousands of tonnes)	(percent)
China	27,767	6.3
India	2,191	6.2
Indonesia	788	7.7
Japan	763	4.2
Thailand	738	-6.5
Bangladesh	657	9.4
Vietnam	511	0.8
Norway	491	6.2
United States	456	4.4
Chile	391	18.0

Source: United Nations 2004, 14–15.

The question can be put in another way: why has aquaculture grown where it has? The answer is that, where the supply of wild fish has been depleted, people have turned to farmed fish as an alternate source of supply. This has been true since the beginning of fish farming in Asia some 2500 years ago. On the depletion of wild fish stocks, the United States turned to the use of fish hatcheries and the scientific study of fish health in the mid-nineteenth century.¹ In Canada, aquaculture began to grow significantly with the exhaustion of the cod stocks on the Grand Banks and the country's declaration of a 200-mile exclusive economic exploitation zone (see Table 2). Two important points should be emphasized here. First, fish farming has not caused the failure of the wild fishery; rather, it has grown as a result of that failure. Second, Canada has a relatively small aquaculture industry because, until recent times, its wild fishery has been large and productive. The question remains, however: given the evident exhaustion of the wild fishery, why has Canada been so slow to convert to fish farming?

Canada's slow conversion to aquaculture can be blamed on three institutional obstacles that have been thrown in its path. First, the federal government department in charge of aquaculture, having been built up in relation to the wild fishery, is having trouble adjusting to the new reality. Second, the nature of government in Canada leaves aquaculture policy vulnerable to the activities of pressure groups. Third, aquaculture has expanded in an era when activists fearful of possible exhaustion of world resources through overuse have acquired greater prominence in public opinion.

1 See Landau (1991, 3-20); and Lucas and Southgate (2003, 2–10).

All three of these causal factors are interrelated, and all bear on “fish health” in different ways. In the wild fishery, little attention is paid to husbanding the health of fish stocks — indeed, science-based husbandry cannot even be applied to fish in the wild — so this concern has few sympathisers in a bureaucracy built up in relation to gathering fish in this way. The growth of aquaculture, by contrast, depends greatly on advances in the science of fish husbandry. Farmed fish must be penned, owned, and kept healthy in order to reward those who would invest in the industry. At the same time, pressure groups to which government is vulnerable worry about the health of the planet’s natural resource base, including stocks of wild fish. They regard science-based aquaculture as self-destructive overexploitation of the earth’s capacity to produce what we need.

Table 2: *The Growth of Aquaculture in Canada, 1986–2004*

	Volume	Value
	<i>(thousands of tonnes)</i>	<i>(\$ millions)</i>
1986	10,488	35.1
1987	13,936	61.7
1988	21,466	105.3
1989	30,273	139.1
1990	36,462	196.0
1991	49,594	233.6
1992	46,931	244.0
1993	53,927	277.6
1994	57,147	302.0
1995	66,269	342.0
1996	73,187	362.5
1997	82,487	392.1
1998	92,104	436.9
1999	114,204	567.8
2000	128,030	608.9
2001	154,069	605.5
2002	171,799	628.3
2003	158,207	591.0
2004	145,840	526.6

Source: Fisheries and Oceans Canada: Statistical Services, Aquaculture; available at web site: < <http://www.dfo.mpo.gc.ca/communic/statistics/aqua> >.

A DYSFUNCTIONAL GOVERNMENT BUREAUCRACY

In Canada, fish farming falls under the jurisdiction of the federal Department of Fisheries and Oceans (DFO), not the Department of Agriculture as are other types of farmed animals such as hogs, chickens, or cattle. Accordingly, the character of regulation and of the regulatory bureaucracy of aquaculture has been determined by two broad sets of conditions. The first set affects the nature of oversight in all departments of the federal government and would impinge on fish farming even if the industry fell under the purview of the Department of Agriculture. The second set of conditions is a consequence of oversight having been given specifically to DFO.

With respect to the first set, although the minister responsible for a department has wide discretionary powers, he or she is an elected politician and must answer to a cabinet bent on re-election. Accordingly, the minister must pay close attention to the necessities of party politics regardless of the private sector exigencies of agents who come under the minister's supervision. Of course, agents who represent important electoral constituencies will find it easier to gain the minister's attention than will an industry such as aquaculture, whose low weight in an election places it in a particularly difficult position. With respect to the second set of conditions, the minister responsible for aquaculture is, inevitably, an industry layperson — a politician dependent on the advice of a bureaucracy that was developed to administer the wild fishery. In short, the minister is exposed to the pressures of electoral expediency, on the one hand, and to the vested interests and vestigial arrangements of the wild fishery, on the other.

Evidence of the consequent regulatory dysfunction with respect to aquaculture is sufficient to have been summarized in a report by the Office of the Commissioner for Aquaculture Development:

Many of the regulations under the *Fisheries Act* [by which aquaculture is regulated] are not well adapted or directly relevant to aquaculture — a situation that results in the aquaculture industry being managed as a subset of the traditional fisheries. This is analogous to equating traditional livestock and crop agriculture to the hunting and gathering of animals and plants. (Canada 2001, 1.)

The report argues that the lack of guidelines and clear policy prevents the aquaculture industry from accessing new sites for expansion as well as new sources of wild fish for feed and breeding purposes. It notes that policy with respect to environmental review comes under six different acts of Parliament, leading to inconsistent interpretations and delays and, further, that failure to enforce environmental standards on other users of the aquatic environment leaves aquaculture open to harmful effects from other activities. The report states that DFO policy with respect to fish habitat has not

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been developed with aquaculture clearly in focus, and such policy as does exist is vague. The report levels a similar complaint against the *Navigable Waters Protection Act*, which deals with site approval, length of leases, site layout, navigation channels, and site marking.

In an attempt to account for these failings, the aquaculture commissioner has laid out two principal causes.² First, there is no method in place by which the risks of economic loss — to the aquaculture industry, to industries and activities competing with aquaculture for resources, or to society as a whole — can be assessed or managed. No attempt has been made to measure the net social and economic benefits of the industry or, indeed, any of the industry's specific operations. Without this knowledge, the regulatory environment as a whole is without rational direction and is subject to whatever pressure particular interests can apply at different local points in the structure of decisionmaking.

Second, the commissioner argues, DFO is staffed by agents sympathetic with, or drawn from, activities other than aquaculture. When all is said and done, the vested interests of the wild commercial and sport fisheries, environmental protection interests, and cattle breeders (who have an interest in the activities of the Bureau of Veterinary Drugs, to which fish farmers must turn for drug approval) have captured the regulatory process and bent it in favour of everything except the newly emerging firms in aquaculture.

This unfortunate state in the department, a consequence of its exposure to political influence and the vested interests of the wild fishery, has been compounded by difficulties arising from the exhaustion of the wild fishery. Apparent mismanagement of the wild fishery in an information environment charged with the concerns of environmental activists has not been a pleasant experience for the department, and it has had its consequences for aquaculture. Industry veteran Brad Hicks has put the matter forcefully.

One of the main reasons that DFO policy development for aquaculture has been so negative from the farmer's perspective is because these policies were and are being developed during a time when DFO is afraid of its own shadow. With the collapse of the cod fishery on the east coast and with the massive restructuring of the west coast salmon fishery and reallocation of salmon under the Aboriginal Fishing Strategy, DFO is afraid to try anything new. Indeed, it has in fact retreated behind the "precautionary principle", or "precautionary approach", and is developing policies that have little to do with the well-being of the fishery or the generation of wealth, but rather policies that are perceived by DFO to simply be *without risk*....Several environmental groups have taken advantage of DFO's profound lack of self-confidence and exploited the situation by frightening DFO into developing policies which these groups favour. For example, several environmental groups have pushed very hard to have feed and fish feces declared deleterious substances under the Fisheries Act. This could only occur if the Fisheries Act is unable to accommodate fish farming and if DFO in its present weakened state has retreated entirely from the concept that Canada's oceans should be a source of wealth for this country. (Hicks 2001, 4; emphasis in original.)

2 Yves Bastien, Commissioner for Aquaculture Development, remarks to the conference "How to Farm the Seas: The Science, Economics, and Politics of Aquaculture," sponsored by the Atlantic Institute for Market Studies and the Canadian Aquaculture Institute, Brudenell, PEI, September 28–30, 2000.

Indeed, Hicks goes on to equate aquaculture's coming under the *Fisheries Act* as analogous to "a chicken farm being managed by the Migratory Birds Act."

As strident as this sounds, the Commissioner for Aquaculture Development, in more guarded words, agreed:

The application of the precautionary principle remains a matter of discussion in the federal government....The absence of a clear definition and policy on its application is considered by some as an impediment to any form of development — a perceived attitude of "if in doubt, do nothing."....[It] is the very antithesis of an approach based on risk analysis and risk assessment. (Canada 2001, 19.)

A Lack of Scientific Expertise within DFO

That there is a relationship between governmental dysfunction and the role of pressure groups seems clear, but what may not be so evident is that at the heart of the problem is fish health.

Fish farming, being rightly perceived as a science-based industry, falls under the responsibility of the Science Branch of the DFO. However, the scientists in the Science Branch are selected for work in the wild fishery and are not really at home with the concerns of aquaculture. Being good scientists, trained in skepticism, they have taken a questioning approach. That is to say, like the fellow from Missouri, they have had to be shown, tediously from the beginning, the sound scientific basis of fish-farming operations. Their caution with respect to matters of fish health — the scientific procedures associated with maximizing the breeding rate, the growth rate, and the disease-free nature of farmed fish — has fed into the paralysis associated with the precautionary approach noted by the aquaculture commissioner. It has hobbled routine operations associated with the on-going business of fish farming.

Few, if any, veterinarians work in the Science Branch of DFO. The wild fishery had no use for them. In that fishery, scientific methods were used, not to improve the product of the oceans through medicine and reproductive technology, but to estimate the size of the stock and to determine the effect of catch methods on stock size. Accordingly, not only are the scientists in the Science Branch relatively unfamiliar with the needs of fish farming, they also lack the expertise to assess the medicines used in fish farming. Instead, the testing of drugs for use in aquaculture has been passed to Health Canada's Bureau of Veterinary Drugs. This bureau, however, deals only with animal diseases after they have been contracted. If a drug is to be used for *prevention* of a disease, approval is the responsibility of the Department of Agriculture. Perhaps this would be ideal if the Department of Agriculture had responsibility for fish farming, but it has not, and so it has no special expertise in fish health. But the problem does not stop there. Following the assessment of a medicine in either or both of these agencies, a test is legislatively required to ensure the absence of any residue of any medicine used in any procedure on an animal. Applying this test falls to yet another government agency, the Canada Food Inspection Agency.

The consequences of this confusion of well-intentioned, even necessary, procedures are long delays and failures in the acceptance of medicines that are useful in fish farming and used in the fish farms of other countries. Not only does the Canadian drug approval system restrict domestic aquaculture to far fewer drugs than are used in Norway or Japan, but the Bureau of Veterinary Drugs charges more for applications for drug reviews than do similar agencies in other countries. Furthermore, although the bureau promises to respond within 180 days, approval times of two years are common. But even a 180-day interval between request and response is twice as long as the process takes in the United States.³

3 Jim Brackett, General Manager of Syndel Laboratories, remarks to the conference “How to Farm the Seas: The Science, Economics, and Politics of Aquaculture,” sponsored by the Atlantic Institute for Market Studies and the Canadian Aquaculture Institute, Brudenell, PEI, September 28–30, 2000.

ENVIRONMENTAL ACTIVISM AND THE LAW OF INSTITUTIONAL IMMORTALITY

The growth of fish farming in Canada is further hampered by the well-meaning, but often ill-informed, intrusions of environmental activists. Marshall McLuhan used to say that when a problem arises for society we do not solve it; we build an institution around it. McLuhan was pointing to a particular embodiment of the Law of Institutional Immortality, which states that, when problems are not solved, pressure groups working toward their solution grow in size and organizational complexity. Indeed, if problems were solved, such institutions would have no reason to exist — they would fade away. But somehow the problems that keep them alive seem rarely to be solved. The institutions find continuing problems, or the remedies they propose miss the mark or make things worse. They would also fade away if public opinion ignored them and financial support dried up. Accordingly, pressure groups exhaust a lot of resources just convincing the public that there is a problem, and those whose incomes depend on the success of such pressure groups can be very persuasive.

From another point of view, problems fail to be solved because proposed remedies are not well thought out, or because those who seek solutions get lost in the maze of public administration. This is where environmental activism interacts with dysfunctional regulatory systems. Activists have to work through governments, the agencies of which have been established to solve other problems. Not unusually, these agencies have been fashioned by forces that have become obsolescent, because the Law of Institutional Immortality applies also in government bureaucracies. One can think of agencies that spend money on canals now used only for the leisure activities of a few, while roads needed for basic economic advance go unrepaired.

The alleged problem for society with respect to fish health follows from the advance of science-based economic activity, and the necessarily experimental way in which such activity has been applied to use of the earth's resources. Very little thought appears to have been given to long-run consequences. Environmentalists point to the disappearance of forests, particularly of aboriginal forests in South America and the East Indies. They point to the emission of greenhouse gases, with consequent depletion of the ozone layer and global warming. They include in this general picture the exhaustion of species, including cod off Newfoundland. The argument for "limits to growth" can be put persuasively, and those who are persuaded have not only a right but a duty to express their concern. But arguments can be persuasive on emotional grounds even when their premises and auxiliary facts are false and their logic is flawed.

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There can be no doubt that the application of science to economic activity has had great benefits. Granted, there have been false starts and unintended consequences — that is the nature of advance into the unknown. On the whole, however, the advance has been beneficial, leading, for example, to population growth with rising living standards and a virtual doubling of life expectancy. Yet, without some means to test the claims of environmentalists against the legitimate claims of science-based expansion, this advance becomes impossible. Specifically with respect to aquaculture, unless some objectivity is brought to bear, the legitimate claims of science concerning the health of fish, and the consequences for the health of humans, will be suppressed.

No one objects to the use of drugs in curing disease in humans. Medicinal drugs leave a residue of chemicals in the body, but that cost, if it is a cost, is considered small in relation to the health benefits gained. Further, whether farmed fish get more diseases than wild fish and so need drugs that wild fish do not need is an empirical question that cannot be answered. Wild fish get diseases, but they are not subject to the same close scrutiny as farmed fish. No one is husbanding the wild stock. Indeed, whole species of wild fish become depleted — the cod off Newfoundland, the anchovy off the east coast of South America — but the cause is difficult to determine. Is it “overfishing,” a change in water temperature, increases in the seal herd, or an undiagnosed disease? In the case of farmed fish, the question is answerable, and there is medicine, if that is what is needed. The situation with respect to fish is really not that different from that of humans.

There is no evidence that anyone’s life has been shortened or that anyone has even become ill from the chemical residue of medicine in farmed fish. What can be observed, however, is that, occasionally, there are escapes from aquaculture pens, where constant observation indicates that diseases exist. And the escapees have been found among wild stock, which may be cause for alarm, but it is something that technical advance can prevent. Further, diseases found in penned fish can be cured with medicines, whereas in the wild diseases go unchecked. If there is a case against fish farming here, is it being made in a reasonable way? According to the aquaculture commissioner, no objective authority is weighing the costs and benefits and judging the merits of the case for or against science-based aquaculture.

Environmental activists posit that there is a problem with the escape of diseased fish from farm pens. Further, they are anxious about residues of medicine in penned fish and about a weakening of reproductive ability in medicated fish. Escapees may spread disease, the environmentalists say, or by interbreeding reduce the reproductive capacity of wild fish. For their part, fish farmers argue that there is no proof these conjectures have any real substance to them, and that the claims of environmental activists are largely emotional and based on unfounded assumptions about the general direction of advancing, knowledge-based economic activity. The farmers claim that objections based on medicinal residue are unscientific and that further use of medicines would eliminate the problem. Further, they find it hard to see how fish with low reproductive capacity are likely to out-reproduce those with high reproductive capacity. According to the farmers, the environmentalists are arguing against the solution to the alleged problem they want to solve.

Who is to judge in this conflict of opinions? The presumed arbitrator in the debate, the public authority, hamstrung by advice from a dysfunctional bureaucracy on the one hand and by the immediate

demands of electoral success on the other, cannot play its role. No well-informed policy is forthcoming. Aquaculture continues its relatively slow advance, and environmental activists step up their public disinformation campaign.

The Case of PCBs and Dioxins

Consider the case of polychlorinated biphenyls (PCBs) and dioxins appearing in fish. Here is a case where the importunities of environmentalists may have done some good; it is also a case, however, where misinformation has led to unwarranted opposition to fish farming.

PCBs and dioxins appear in wild fish. Wild fish, in the form of fish meal, are fed to farmed fish. Since PCBs and dioxins, the pollutants in the fish meal, build up in farmed fish, there are some grounds on which to conclude, as activists do, that farmed fish “may” not be healthy and, if eaten, “may” be a danger to human health. But David Groman, a fish pathologist with the Aquatic Diagnostic Services of the Atlantic Veterinary College, puts the matter in a different light.⁴

Pollutants build up particularly in fatty fish, whether in the wild or in captivity. The extent of the build-up depends on the feed source in the wild. Some fish eat plankton containing the pollutants, others eat other fish; some are fatty fish and eat more fatty fish than lean fish. In the wild, there is no control over sources of food and eating patterns, and there can be none. In the case of farmed fish, however, the feed source can be tested for pollutants and modified to reduce build-up. One can make three additional points. First, the waters used in fish farming can be chosen to avoid pollutants; second, it is in the farmer’s economic interest to reduce the level of pollutants in order to increase the market value of his stock; and, third, farmed fish are harvested at a time when their growth slows below the optimum rate, limiting the time over which the fish are exposed to whatever process of build-up is taking place. So the solution to the problem of pollutants in fish ought to result in a plea for more, and more thoroughly cultured, farmed fish. Yet, given the difficulties of the Canadian aquaculture industry in the matter of site acquisition and approval of medicines, that plea would be a cry in a wilderness.

There are, however, still more illogical aspects to complaints about PCBs and dioxins in fish. Dioxins, for the most part, are produced in industrial processes, though they also appear in nature — for example, as a by-product of incinerating waste and forest fires. Moreover, dioxins are not all alike. Some are more toxic than others, although dioxins in general are toxic when taken into the body in sufficiently large doses. Some are more quickly biodegradable than others. PCBs, a special form of dioxin, were deliberately produced to serve as a stable, fire-resistant medium in electrical transformers and batteries. They are very toxic and not quickly biodegradable.

The industrial processes that produce dioxins began to multiply in the 1920s. By the late 1960s, the presence of dioxins in unwanted places in the environment and the associated potential for damage

4 Personal interview, April 14, 2004.

was noted. The production of PCBs was then banned in the United States, and by 1980 all other industrialized countries had followed suit. Over the past 30 years, the US Food and Drug Agency, Environmental Protection Agency (EPA), Food Safety Inspection Agency, and Centers for Disease Control and Prevention have been active in regulating and eliminating all dioxins, as both inputs and outputs in industrial activity. Other countries have taken similar steps. As a result, the level of all dioxins in the environment and in humans has been falling for the past three decades (Baird 1999, 341). Still, dioxins do not disintegrate quickly; they remain a threat to health both in fish and humans, and continued vigilance is required. Ironically, eating fish is an important part of vigilance. Most dioxins found in humans are carried into the body in food, and are found particularly in animal fat. Accordingly — and ironically, considering the complaints of environmentalists — to reduce the intake of dioxins, the EPA suggests that consumers “choose fish” because they are relatively low in both fat and dioxins.

The level of dioxins is falling in humans, and eating fish, especially fish cultured to lower the level of dioxins, will cause it to fall even faster. How, then, can we explain environmentalists’ complaints about dioxins in farmed fish? Considering that two-thirds of all fish meal produced is fed to farm animals other than fish, and dioxins accumulate in the fat of animals other than fish, would it not be logical to complain about dioxins in meat and fowl rather than in farmed fish? One can speculate that the reason environmentalists are less concerned about dioxins from that source is that it has been a long time since the fowl and meat we eat came largely from the wild. There is no “nature” to be preserved in stockyards, pigpens, and factory-like hen houses. Besides, the industries that produce meat and fowl are established institutions with public relations agencies and well-paid legal advice. And, there can be no appeal to pictures of fresh-water lakes, forest vistas, and cute baby animals in the wild. In short, the broad assumption that science-driven economic advance is destroying the natural basis of life on earth finds no resonance in the cases of pigs, cows, and chickens. So, the attack on fish farming in the matter of dioxins seems to be simply a matter of misinformation. Consider the following:

Charles Santerre, a professor of food and nutrition at Purdue University, [has stated], “The nutritional benefits of salmon are pretty amazing....[A]ll the data we have today suggest that everyone should be eating more farmed salmon.” Salmon are rich in Omega 3 fatty acids, which help prevent heart attacks. They are also important for fetal brain development....[T]he Pew Charitable Trust,....rated by Washington’s Capital Research Center as being on the “radical left,” [has published a study that says] you should shun farmed salmon....What has happened here? The food supply isn’t contaminated by PCBs; the science supply has been contaminated by politics. (Crowley 2004.)

The Disconnect between Environmentalists and Scientists

Two things seem clear. First, there is a disconnect between the reasonable hesitation of environmentalists to plunge into uncharted territory and the equally reasonable thrust of scientists to solve

problems by doing just that. Second, the tragically conflicting efforts of citizens to do right in these matters feed into the inertia of a dysfunctional set of political and administrative institutions. The result is a situation in which problems are not solved, but become the *raison d'être* of permanent institutions that influence the information environment. This is the working of the Law of Institutional Immortality.

The disconnect between the often-laudable aspirations of environmentalists and the realities of fish farming seems invincible. Some environmental activists have lobbied to have all fish marked as wild or farmed, so the public can be made aware that it is eating farmed fish. This is not an appeal for simple product identification, however, but an appeal to have fish marked *before harvest* to ensure awareness of the nature of the product's source. Gerry Johnson, a veterinary pathologist and Director of Diagnostic Services at the Atlantic Veterinary College, states that, for years, such an appeal was not practicable, because all attempts to mark fish in the water had proven not viable on technical and economic grounds. Accordingly, the appeals were never satisfied, and the institution making the appeal carried on. Recently, however, marking in the water has become feasible and is being done.⁵ Still, the sun has not set on those making the appeal; they have taken up a different complaint. The institution goes on.

The continuing existence of one set of organizations with a misinformed intent soon begets the existence of another set intent on countering the actions of the first. Faced with harassment from environmental nongovernmental organizations (NGOs), the aquaculture industry has had little choice but to organize a defence. Indeed, members of the industry have common concerns that would lead them to organize nationally even if they were not being publicly attacked:

- the cost to themselves of diseases in their stock;
- the need to maintain international competitiveness by producing an acknowledged quality product;
- the benefits to be achieved when research is centralized to make profitable activities that small, private farmers would not otherwise undertake; and
- the need to enforce regulations that are good for the industry as a whole, but from the evasion of which one or two farmers could benefit.

These reasons notwithstanding, it has been the goad of harassment by environmental organizations that has given energy to the drive of fish farmers to organize. The Law of Institutional Immortality becomes a Law of Institutional Multiplication.

Government agencies concerned with aquaculture, being sensitive to public opinion, also organize around the problems of the industry, but not in a manner likely to solve the problems. Old organizations survive and grow by expanding into new areas of concern even when the expansion involves moving in a direction different from that on which they first set out. Indeed, survival under such circumstances entails co-opting insurgent movements for reform, thereby inhibiting the advance of movements that otherwise would force painful adjustments. Institutions, having outlived their

5 Personal interview, September 9, 2003.

usefulness, will seek out new problems on the basis of which they can continue to exist, even though their history demonstrates they are ill-suited to dealing with such problems.

For example, DFO was set up to serve the wild fishery, a simple gathering industry, whereas aquaculture, like agriculture, involves direct investment in and husbanding of owned stock. Aquaculture is an emerging or insurgent element in the world of fish food production. Now, if some agency other than DFO were to regulate aquaculture, and if the industry continues to grow as the wild fishery declines, then DFO would face painful downsizing, if not complete disestablishment. Thus, in this scenario, the rise of aquaculture threatens the positions of agents in DFO. If, however, fish farming were to continue to be overseen inside DFO, it would be handled by people sympathetic with the established order and old ways of doing things, which would significantly diminish aquaculture's institutional threat to the department. Indeed, in countries that lack the kind of wild fishery establishment that has existed in Canada or where the priority is development rather than conservation — in China and Chile, for example — aquaculture faces far fewer difficulties than in Canada, and it has expanded at a much faster rate.

In the broad institutional environment of the Canadian fish farming industry, three sets of organizations are competitively expanding in relation to one another:

- the Canadian Aquaculture Industry Alliance and its provincial subsidiaries, such as the Newfoundland Aquaculture Industry Alliance;
- environmental NGOs, such as the David Suzuki Foundation and its subsidiaries and allies such as the Sierra Legal Defence Fund, sport fishers associations, local boat and property owners associations, and the Aquaculture Association of Canada, which has been organized in an attempt to get all of these under one roof; and
- federal and provincial government organizations.

The last of these sets is the largest, consisting of many ramifications, each with a hand in aquaculture. All three sets have come together in yet another new organization, the National Aquatic Animal Health Program, to which the federal government recently allocated \$59 million. In handing out this money, Ottawa asserted that,

[b]y proactively protecting the health of Canadian aquatic animals [the program] also protects the industries such as commercial fishing and aquaculture, which depend on them and thus contributes to the overall economic health of a region.... A reliable source of healthy marine products, which meet international standards, protects and expands export markets while boosting local economies, supporting jobs, and promoting a higher quality of life.⁶

This new institution has been built to house the problem of conflict between established regulation, insurgent aquaculture, and the concerns of environmentalists. There is nothing in its mission statement, however, to indicate that the problems of aquaculture will be solved in this context. Once again, the Law of Institutional Immortality holds.

6 See website: <http://www.dfo-mpo.gc.ca/media/infocus/2005/20050223/funding_6_e.htm>.

FISH HEALTH: THE BROADER INSTITUTIONAL CONTEXT

The slow growth of aquaculture in Canada, despite the availability of natural resources and technical knowhow, cannot, however, be explained entirely by the intervention of political pressure groups and the inertia of a bureaucracy designed for a wild fishery.

Science-based investment in fish health is the substantial element in the growth of aquaculture. Yet, unless the stock is owned, so that the returns on investment are recouped by the investor, investment by any one harvester will not yield a return for that harvester; instead, it will go to all other harvesters. In such a situation, no harvesters have an incentive to invest. In the livestock industry, for example, investment takes place in the health of cattle, and an effort is made to maintain the stock of cattle by slaughtering at a rate that ensures a continuing stream of returns. The cattle and the land on which they are fed are owned outright. Planning for the future is possible, and investment can have a return from which non-owners are excluded. In the wild fishery, where the stock is an open-access resource available to all, investment in fish health is not undertaken, and attempts to maintain a rate of harvest that does not deplete the resource have failed. At the heart of this dilemma is the obsolete constitutional treatment of the environment — that is, the waters — in which fish are farmed. To illustrate the point, it may be useful to step back and examine how this situation arose.

In its beginnings, English feudal organization was intended to facilitate defence against marauding bands of invaders. Military survival, not economic growth, was the goal and, as in all times of war, centralized, relatively absolute power was a necessity. Control, particularly control of land, cascaded down from the king to greater and lesser nobles. It was shared vertically and not held in one set of hands. Once the invasions stopped, however, the purpose of social organization changed from military survival to economic advance. To facilitate achievement of that end, control of land was transformed, in a long and sometimes bloody conflict, into single-person private ownership. This was not so, however, in the case of lands newly discovered and held in right of the Crown by Parliament, which, by the late seventeenth century, had asserted its rights over an erstwhile feudal monarchy. Having opposed the power of a feudal monarchy and acquired control over that power, Parliament refused to let it go. Arbitrary exercise of sovereign power, while restrained by rule of law and review of the courts in England, was not so restrained in the land grant system of the colonial period in North America.

One remarkable consequence of Parliament's continuing to exercise this feudal right was the American Revolution. The new United States rejected feudal power even though exercised by an elected parliament. Canada, however, accepted Parliament's assertions and its exercise of feudal

It Is FARMING, Not Fishing

prerogatives. As the Canadian constitution evolved after the colonial period, the provinces and the federal government came to enjoy a feudal right over publicly owned or “Crown” land and, most important for this discussion, water — the surface, floor, and water column of oceans, lakes, and streams. Judicial decisions of the Privy Council in the nineteenth and early twentieth centuries confirmed provincial feudal ownership of minerals and non-alienated land — that is, land that has not been alienated from the Crown before it is put to productive use — while ownership of adjacent seas remained federal.

Unlike land, however, water is not alienated into private property at the point of being put to productive use. This has meant that the federal government, and the provincial governments when peripherally involved, exercise feudal jurisdiction over activities in coastal waters. That is to say, their exercise of power, except in the matter of First Nation treaty rights, has not been constrained by the constitutional rights of individuals in the private sector. In essence, government control over water is essentially an autocratic vestige of an era preceding liberal democracy and capitalistic enterprise. Aquaculture is thus carried out in an obsolescent, economically dysfunctional constitutional arrangement.

Now, the discretionary powers held by Parliament in right of the Crown are vested in the ministers of the Crown, whose responsibility it is to exercise those powers in the day-to-day activities of government. Wherever such control is exercised, there are no private rights against the decisions of the minister. That is to say, private property and the conditions of a capitalist market system do not obtain, and the economic benefits of those institutional arrangements are foregone. In the case of aquaculture, an efficient level of investment in the health of fish — the rate of growth and the quality of the product — is institutionally blocked.

The economic success of private property and the capitalist market system derives from the allocation of the residual of the enterprise’s revenues over its costs. With private property, a surplus of income over costs goes to the agent responsible for generating the surplus. In a feudal system, control over the enterprise is constrained by shared rights, and the residual goes to overlords, rather than to those who do the work, take the risks, and are responsible for productivity. In a feudal system, farmers have no incentive to become more productive, because their hands are not free and they do not derive the benefit of it. Ownership of land by those who till the soil and reap the economic benefits of doing so has characterized agriculture in countries like Canada and has generated its great success.

How different are the cases of agriculture and aquaculture!

- Lands beyond the agricultural frontier were considered “empty.” First Nation rights were packaged into a minuscule, ill-defined bundle and attached to reservations located on less fertile soils. The seas of the aquacultural frontier, in contrast, are burdened with ancient common law riparian rights and more recent treaty rights to access, exploit, and traverse.
- The lands of the agricultural frontier were alienated from the Crown into private property. The seas have remained under the ownership and discretion of the Crown.

- From the beginning, it was technically possible to fence the privately owned lands of the agricultural frontier. Until recently, there has been no economically feasible technique by which the seas could be “fenced.”
- The lands of the agricultural frontier were perceived to be withdrawn from the “wild” and to have become cultivated. The seas, though cultivated, have not been perceived to be withdrawn from the “wild.”

These institutional circumstances of aquaculture, particularly the stark fact of Crown ownership and control at ministerial discretion, have had seriously damaging effects. They are, for example, at the root of lease and permit arrangements, rather than ownership arrangements. The place, length of time, and secondary conditions of leases and permits are entirely in the hands of government. Secure tenure, established rules, and recourse to the courts are simply not there. The arrangements are truly arbitrary, if not simply whimsical. In every law setting out the conditions under which leases and permits may be acquired, there is a series of statements empowering the minister, invariably phrased “the minister *may* [do something]” — not what the minister *shall* do or *may not* do. There are, in consequence, no grounds on which a fish farmer can appeal against capricious, unjust, and damaging behaviour on the part of the minister. An instance may illuminate the point.

For seventeen years [Atlantic Silver Inc.’s] licenses to operate have been reviewed and granted on an annual basis....Shane Bothwick, President of the Aquaculture Association of New Brunswick, says...that the site allocation process is seriously flawed. He wrote, “The minister has placed many farmers in a critical position by denying applications altogether [and] by failing to make decisions [until] the eleventh hour. Some industry pioneers...are literally being put out of business by the minister’s decisions, while others...are at great risk because of a process in desperate need of repair.”...The Department of Agriculture, Fisheries and Aquaculture turned down the company’s site approval application just days before Atlantic Silver was going to put 400,000 smolt in the water. Desperate, [the company] had no other option but to take the government to court....It was just “No”....The province and the federal government did not have enough time to process the application before spring entry....Atlantic Silver had submitted their proposal in June of 2001, so from June 2001 to February 2002 the application sat on a desk in the Department....The judge ruled that the minister was under no obligation to give prior disclosure of his concerns before saying no to a site approval application....The government’s lawyer...argued that the government has no obligation to be fair. He explained that the government only has to follow its own guidelines and it does not have to treat everyone the same or fairly....The judge upheld the province’s decision. (*Northern Aquaculture*, June 2002, 3; *idem*, July 2002, 6.)

Without secure tenure and established efficiency-generating rules of procedures, fish farmers will not invest energy and money in long-term productivity (fish health), and neither will lending institutions support such efforts. The cause of the anomalous lag in the advance of a science-based industry in a region of advanced science is evident.

TOWARD A SOLUTION: THE CHILEAN EXAMPLE

From 1990 to 2001, Chile increased its exports of farmed salmon eightfold, from US\$122 million to US\$969 million, and is now one of the largest salmon producers in the world (Jensen 2003, 29). The industry now provides direct and indirect employment to 45,000 people and is driving economic development in the south of the country.

Two principal elements are responsible for the remarkable success of aquaculture in Chile. First, the country has enacted legislation under which a fish farmer may obtain a licence to perform aquaculture activities for an indefinite period of time in areas falling within the jurisdiction of the General Directory of Waters. The property rights of the fish farmer are transferable, subject to approval by the issuing authority, and in general are judicable in the courts. Similarly, leases are administrative acts through which the Chilean defence ministry grants an individual the right to use certain national resources for an indefinite amount of time. Again, these rights are transferable and in general judicable in the courts. The object of both the licence and the lease is to cultivate certain species of aquatic life under no other limitations than those stated explicitly in the law. Moreover, the holder of a lease or licence may ask to have it modified to include one or more species other than those for which it was initially granted. Chilean fish farming has forged ahead because its legislation specified what the administration, rather than the farmer, shall do.

The second element of the success of Chilean aquaculture is the establishment of a national aquaculture policy that has aquaculture, not the preservation of a wild fishery, as its goal. That is to say, Chile did not have a large wild fishery producing for export. Nor did it have a large bureaucracy and a policy intended to handle problems of overharvesting in a wild fishery, as has been the case in Canada. Instead, Chile's policy and bureaucracy have been built up with the intention of developing export-oriented fish farms.

CONCLUSION

Aquaculture in Canada is being held back by a dysfunctional government bureaucracy, by an obsolete property rights system, and by the machinations of environmental activists operating through pressured, unthinking mass media. The principal policy prescriptions to remedy the problems aquaculture faces are the following.

First, establish private property in aquaculture to the extent that it is established in agriculture. Fundamentally, this means giving the fish farmer ownership of the means of production, and exclusive right to the profit gained from the farmer's use of those means. There are other users of the water surface, column, and sea floor. They have historical rights, but those rights should be defined with the health of fish farming in mind. If outright ownership should seem impossible, for whatever reason, then leases and licences should be for a sufficient length of time to encourage investment in water quality, equipment, and fish health in general. They should also be of sufficient length to provide security for lending agencies. Finally, the property rights of fish farmers should be supported by government-organized and -financed policing.

Second, separate government administration related to aquaculture from administration of the wild fisheries. Ideally, this would mean a separate and fully competent independent government agency to regulate and support aquaculture — that is to say, a one-stop shopping centre for all the drug-related, import-export-related, and industry-entry-related activities associated with fish farming. A less comprehensive alternative would be to hive off an independent unit within the Department of Agriculture, and make it self-sufficient in satisfying all the needs of fish farmers, or at least give it clear and speedy access to services more efficiently provided by other governmental agencies.

Third, replace politicized decisionmaking with objective cost-benefit analysis in disputes concerning aquaculture and other uses of resources. The Commissioner for Aquaculture Development has stated that the precautionary principle has been applied to the point of paralysing the Department of Fisheries and Oceans, but there is no alternative, institutionalized, economics-based process ending in objective analysis of disputes over rights of use and government regulations. There should be an office of economic analysis that instructs both the bureaucracy and the courts on the short- and long-run development effects of their decisions with respect to fish farming and competing activities. Further, the office should be independent of any of the competing interests involved.

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