Aquaculture Property Rights in Canada

Robin Neill[1]

"We must plant the sea and herd its animals … using the sea as farmers instead of hunters. That is what civilization is all about—farming replacing hunting."
—Jacques Cousteau

Aquaculture (fish farming) has a significant advantage over wild fisheries: it provides the opportunity for farmers to invest in and control the harvesting of a stock of fish. The fish farmer can control feeding and treat diseases to ensure a high quality product, and the harvesting of farmed fish can take place when the fish have reached their optimal age and size. Further, because the farmer owns and physically possesses the fish, he or she can capture the economic benefits of such investment and control, and thus is driven by self-interest to undertake the one and exercise the other.

There are negative externalities associated with (or allegedly associated with) aquaculture, including escapes of diseased or genetically modified fish, local pollution of the ocean bed by heavy accumulation of fish feces, disruption of navigation, and visual pollution of shoreline. But there is also a singular negative externality associated with the wild fisheries: the failure to invest in the breeding and health of the fish that are to be harvested. This externality has been intensified by the race to capture fish before they are gone, a race that has led to the very thing that is feared—extinction of the stock.

The economic cost of collateral damage in fish farming has not been established with general acceptance, and the cost of the depletion of fish stocks has not been established with any precision. However, there can be no doubt that the cost of the singular externality in the wild fisheries is greater by orders of magnitude than the presumed costs of negative environmental impacts associated with fish farming because, on the East Coast and elsewhere, this externality has led to the depletion of whole species to the point of endangerment.

An appropriate set of private property rights for fish farmers would markedly raise efficiency in the production of seafood, while helping to eliminate whatever negative externalities may be associated with their operations. Even a cursory glance at the property rights structure of the two forms of producing seafood (fish farming and fishing in the wild) would indicate this point. A close look confirms it.

1 Some of the material in this presentation is taken in whole or in part from work that the author has done for the Atlantic Institute for Market Studies. The author thanks the Institute for permission to do this.

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Fish farming and private property

The principal difference between wild fisheries and aquaculture is that aquaculture is farming, not fishing. With some assistance from hatcheries, wild fish are produced as nature produces coyotes and migratory birds. In contrast, fish farmers cultivate fish for harvest just as farmers produce hogs and beef cattle. As the Canadian Aquaculture Industry Alliance (2006) explains,

> aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. The term 'farming' implies intervention in the rearing process to enhance production, such as regular stocking, feeding, and protection from predators … Farmers invest in production systems, manage livestock to optimize productivity, and coordinate sales to earn a return on investment.

Of the many aquatic animal species, only a few have been thoroughly domesticated—principally, carp, catfish, clams, mussels, oysters, salmon, shrimp, striped bass, sturgeon, and trout. Still, domestication of these few species has created the fastest-growing food production sector in the world today.

The livestock raised in aquaculture are recognized in law as the private property of farmers. The means of production—the resource base—is not. Aquaculture has only recently risen to importance in the global economy. The broader property rights conditions of fish farming are still under review, frequently in the face of opposition from those who have vested interests in the relatively declining alternative uses of the resources involved. At present, the rights of fish farmers fall far short of those that have been accorded to and have proved so successful for agricultural farmers, but progress is possible. As Elizabeth Brubaker writes,

> a further evolution could entail outright ownership of fisheries, removing owners' obligation to utilize their resources exclusively as fisheries when conservation, tourism or other uses proved more valuable … Technological advances, by facilitating the enforcement of property rights spur their development. (1995: 212)

In this passage, Brubaker hints at the possible transformation of fishing into fish culture rather than fish capture. She is proposing the privatization of a portion of the water surface, column, and floor so that it may be owned in the way a farmer owns land in pursuit of agriculture. Centuries ago, the time came to turn from nomadic hunting of animals and gathering of plants to settled agriculture. That time has now come for the production of seafood. History and the current problems with the wild fishery point to the eventual granting of full ownership of portions of the sea and inland waters to fish farmers.

Private property and investment

The principal externality of the wild fisheries is that nothing is done to improve the quality of the stock or its appropriateness to the human needs that it serves. All animals and plants can be bred and nurtured to higher standards from the point of view of usefulness to humankind. Fish are not an exception.

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Fish farming civilizes[2] the sea. Open-ocean aquaculture, in particular, will reorganize the sea by reducing it to a significant degree to the controlled use to which the great central plains of North America have been reduced. Change of any kind is always difficult, but such a change in the use of the open sea must be especially shocking to anyone who is sensitive to the loss of mankind's natural environment. The concerns of environmentalists are understandable, but a "zero tolerance" stance on fish farming would be a backward and uneconomic policy. As noted above, Brubaker has proposed an alternative policy. She argues that given the correct private property rights, the market will allocate resources most efficiently—that is, to their least costly and most productive uses.[3]

While it is true that the advance of civilization has clearly changed the natural environment, it is also true that changing the environment is necessary to the advance of civilization. To civilize is to shape the raw forces of nature into compatibility with ordered human life. Certainly, there are risks; but science advances by taking risks. Problems arise and problems are overcome.

Many of the externalities associated with fish farming are untrue. For example, the existence of genetically modified "frankenfish" that could threaten the existence of all fish has not been empirically proven. It's still just an allegation. And if it seems that there are more diseases among penned fish, it is because diseases are monitored in the pens, and remedies are applied. The diseases of penned fish exist in wild fish first, but among wild fish they go undetected and untreated. Further, with respect to the charge that a greater weight of wild fish is fed to farmed fish than is harvested from the pens, it should be noted that farm fish do not eat any more fish than do wild fish. Indeed, farmed fish are less damaging in this respect. Much of what they eat is recycled offal from the gutting and filleting of commercially caught wild fish. Additionally, farm fish are trained to eat non-fish nutrients. The simple truth is that aquaculture improves the quality and quantity of product at a lower cost in nutrients (see, for example, Greenberg, 2006, June 18).

Without doubt, fish farming itself may have externalities, but a zero- or low-tolerance approach would be wrong. What is needed is objective analysis on a case-by-case basis.

> The technical advance of aquaculture

Dozens of species of fish are already being domesticated, as cattle and horses were in the past. Most recently yellow tail, red snapper, halibut, and cod have been domesticated, leading to investment in the improvement of the stock. In Tromso, Norway, cod are gathered from the wild and selectively bred to grow faster and at a lower cost in feed per pound of product. These fish are bred, born, raised, and harvested in a controlled environment. They are induced to accept a nutritious diet that includes less and less fish, and are kept from cannibalizing one another as they do in the wild.

2 The word "civilize" is used here as it is in the initial quotation by Jacques Cousteau—that is, in the broader Thorndike-Barnhart dictionary definition: "to bring out of a savage or barbarian condition."

3 Brubaker has documented the unfortunate dissipation of open-access resources under government ownership and regulation in her book, *Property Rights in the Defense of Nature* (1995).

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Aquaculture will do for fish food production what scientific breeding and care has done for animal food production. For example, inland fish farms in the United States have succeeded at raising high quality catfish on an entirely non-fish diet. Further, there is no doubt that fish farming has the technical capability to expand beyond the shore line to which it has been largely confined until now.

The Atlantic Marine Aquaculture Center (2008) has established a 30-acre field site, six miles off the coast, where native finfish in submersible cages and native shellfish on submerged long lines are raised. Similar success has been reported from research stations in Hawaii, Puerto Rico, and Scotland. The cages may be anchored or free floating and locatable by transponders. If free floating and tracked by transponders, their operation is something like the grazing of branded cattle on the open prairie. Given the capabilities of global positioning systems and self-positioning, unmanned propeller systems, it is possible to "fence-off" a section of the ocean surface and water column for the exclusive use of a single farmer. All of this is well known (OSF, 2006); unfortunately, some are opposed to the application of this technology in the marketplace.

> Technological advance and property rights

Despite the present rate of technological advance, fish farming will not achieve its potential unless it can operate in a legal environment that is similar to that in which plant and animal farming has had such remarkable success. The land farmer owns his land, his crops, and his stock of animals. It is to his advantage to husband his fields and care for his stock in such a way as to gain the greatest advantage at the lowest cost over his entire planning time horizon, which, with outright ownership, extends to the lives of his descendants. By serving himself in this way, the farmer serves society well. The absence of similar property rights for fish farmers removes not only the motivation, but also the economic feasibility of a similar, generally beneficial result.

Fish farms in the United States endure a legal environment that is not much better than that in Canada. The one great hope of open-ocean fish farming in the United States is its emancipation from the control that state governments have exercised over the traditional three-mile limit. Open-ocean fish farming beyond the three-mile limit could come under exclusive federal jurisdiction, and the narrow, established interests that have dominated state regulation to the detriment of aquaculture could be bypassed.

During its 2005 session, the Alaska State Legislature unanimously passed a resolution opposing offshore aquaculture in federal waters. All the usual objections were raised, and it was claimed that a dramatic increase in fish farming nationwide would likely result in a great decline in the value of Alaska's commercial fisheries. This objection embodied an unabashed attempt to use political means to frustrate the efficient working of the market for fish and punish the rest of the world for the benefit of an increasingly obsolescent local industry. In its opposition to open-ocean aquaculture the Alaska Marine Conservation Council enlisted the support of established interests by referring to possible negative socio-economic impacts on coastal communities and fishing families. It also appealed to powerful environmental lobbies by arousing all the usual fears about collateral damage.

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The text of the United States' *National Offshore Aquaculture Act of 2005* detailed the problem. If passed, it would have given the Secretary of Commerce the authority to make areas, known as "exclusive economic zones," available for fish farming to those who met certain terms. Prior to granting the permits, however, the secretary would have had to consult with all relevant interests: the states, the wild fisheries lobbies, boat owners associations, oil companies holding offshore leases, environmentalist's organizations, the Secretary of Defense, the Coast Guard, and all those who hold navigation rights. The document paid little attention to the rights of the applicant farmers. Under this act, the granting of permits would have been determined within 120 days following the application. Sites would have been permitted for a duration of 10 years, but renewable only in five-year increments and at the discretion of the secretary. Beyond this and the requirement that the secretary promulgate all relevant rules and regulations, the act put no binding limitation on what the government could do in the matter of granting and revoking permits. The government would have had to return to the farmer any equipment that it seized in the process of enforcing regulations, but this and the right of the farmer to transfer his permit by sale were the only private property concessions in the act. The principal obligations laid on the secretary pertained to all interested parties other than the farmers. Site placement, monitoring, evaluation, and all other terms of a permit were subject to the discretion of the secretary. Further, Section 7 (f) of the act specified that nothing was to "displace, supersede, limit or modify the jurisdiction, responsibilities or rights of any federal or state agency, or Indian Tribe or Alaska Native organization, under any Federal law or treaty." Perhaps most crippling, the act stated that "the law of the nearest adjacent costal State, now in effect or hereafter adopted, amended, or repealed is declared to be the law of the United States, and shall apply to any offshore aquaculture facility." The bill died in the Senate in the fall of 2006, forestalling any advance it might have facilitated.

> Aquaculture property rights in Canada

In Canada, where the system of aquaculture property rights is of old—even ancient—vintage, there is no general move towards institutionalizing open-ocean fish farming. In 1982, the surge in aquaculture enterprise associated with declining wild fish stocks and the establishment of a national 200-mile exclusive offshore fishing zone prompted a thorough review of property rights in Canadian aquaculture (Wildsmith, 1982). Much of that stocktaking involved tallying the powers of and restraints on government as outlined in the Constitution and judicial interpretation of the Constitution. The tally revealed that many of the jurisdictional problems embedded in the Constitution directly affected aquaculture. Property and civil rights fell under provincial jurisdiction, but jurisdiction over offshore areas, navigable waters, and the offshore fishery belonged to the federal government. At the time the review was conducted, the courts had not yet settled definitively on whether aquaculture was to be treated as fishing or agriculture; as of February 2003, aquaculture still had not acquired a fixed definition in case law. Accordingly, the review concluded, aquaculture would have to remain a matter of joint federal-provincial jurisdiction, and its development would depend on cooperation between the two jurisdictions.

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The 1982 review found that the fish farmer's common-law rights included the usual property right to domestic—that is, penned—animals (except in the rare cases where the courts defined fish as a wild animal), but the farmer had no right to the sea bed, the water column, or the water surface. Full property rights to the foreshore—the land between low and high tide—seemed to be a possibility, and in one or two cases the courts recognized prescriptive rights when investments had been made in the absence of a lease or grant from the Crown. Rights down to high tide belonged to the owner of the land adjacent to the water, meaning that the fish farmer did not have the right of unimpeded access unless he also owned the upland. The common-law right of all citizens to fish and navigate on the surface was protected by the courts. Inland, common-law riparian rights were protected up to the middle of the body of water or watercourse, except when, as in Nova Scotia, the province had declared such rights to be inalienably vested in the Crown. In short, the review found that aquaculture, which had recently arrived on the scene, had no recognition in common law except where it conformed to existing activities.

With the exception of a 1928 agreement between Prince Edward Island and the federal government concerning the farming of live oysters and other molluscs, all aquaculture-related laws in Canada were created in the late 1980s. All of them were the product of memorandums of agreement between the federal and provincial governments, and all were intended to ensure the orderly development of aquaculture through "one-stop" licensing and leasing procedures. Still, Peter Underwood of the Nova Scotia Department of Agriculture and Fisheries told a Canadian aquaculture law and policy workshop in February 2003, that, in practice, Nova Scotia was still struggling to establish a one-stop system for leasing and licensing.

All of these agreements are similar in that they provide for the continuance of all laws established before the acts based on the memorandums of agreement. They entrench the coastal rights of upland owners to unobstructed access to adjacent waters, and they ensure passage to previous users by entrenching the strictures of the federal *Navigable Waters Act*. Except in the case of Prince Edward Island, all Canadian laws formally place the process of licensing and leasing under provincial administration, but this largely has to do with paper passing, not decision making. Through the Department of Fisheries and Oceans (DFO), the federal government retains control over the transport and export of fish and the protection of fish health (including the certification of disease-free fish farming), and is responsible for the research and development of culturable species. The DFO also determines whether applications for aquaculture licences and leases will be accepted or rejected. In other words, the federal government has not even alienated aquaculture property rights to the provinces, let alone to individual citizens.

The precise administrative arrangements stemming from the federal-provincial agreements vary in detail from province to province. In New Brunswick, for example, the Department of Fisheries and Aquaculture issues leases in consultation with the DFO. In Newfoundland and Labrador, the Department of the Environment, in its concern with the erection of shoreline facilities, issues permits to occupy Crown lands. In Nova Scotia, an Aquaculture Administrator in the Department of Fisheries, Aquaculture, and Inland Fisheries, in

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cooperation with the DFO, reviews applications for licences and leases and arranges for public hearings in the local communities concerned. In every case, licences and leases are limited in terms of size, duration, and the kinds of activities that can be undertaken. In Nova Scotia, for example, sites for mussels are usually 25 hectares in size, while those for oysters are seven hectares. In Prince Edward Island, leases are issued for two to four hectares for harvesting oysters, or for a specifically prescribed size and season. In British Columbia, licences are issued for a 12-month period and are renewable. In accordance with a court decision, all land in British Columbia between the islands and the mainland is considered provincial and can be leased out by the province.

Though there are differences between the provinces' administrative arrangements, in every province, there are incentives, subsidies, and various kinds of assistance that are intended to foster the development of the industry. These arrangements do establish some property rights for harvesters, but they do so almost accidentally and certainly at random.

Hidden behind these administrative arrangements is the most striking aspect of the current status of property rights in Canadian aquaculture: the nature of the relationship between the fish farmer and the government, a relationship that defines the "spirit of the law" governing the industry. The institutionalization of aquaculture in Canada clearly follows a government-dominated administration model. Licences and leases are granted, renewed, altered, and terminated at the discretion of either a politically appointed official or, more frequently, the political head—that is, the minister—of the licensing and leasing department.

Nova Scotia's *Fisheries and Coastal Resources Act* is typical of aquaculture laws in Canada. The act repeatedly uses the phrase "the minister *may*"; it rarely says "the minister *shall*," but it often says "the lessee *shall*" (emphasis added). Both political considerations and common sense would likely direct the minister to act with circumspection in the disposition of licences and leases. Still, the situation is clear: the government acts as the overlord of the resource. No secure property rights are accorded the agent on the ground—the fish farmer.

Even the casual observer would be forced to conclude that, whether deliberately or inadvertently, lawmakers have failed to take into account the question of property rights, the structure of those rights, and their implications for investment in the breeding and care of fish. If the fish farmer had a right to the means of production, exploitation of those means would be in the hands of the agent who is undertaking the risk and the effort and has the strongest interest in the long-term viability of the enterprise. The importance of establishing appropriate private property rights in the industry cannot be overstated.

Government management of resources has been no more efficient in aquaculture than it has been elsewhere. It has failed to establish or enforce the rights of citizens, it has tended to favour special interests, it has had a blinkered concern with short-term economic development, and it has had a bias in favour of administrative solutions (Brubaker, 1995).

> The ideal solution

There are several ways in which private property rights could be established—that is, transferred or alienated

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from the public (the government in right of the Crown) to private individuals—in Canadian fish farming. These ways include auction, outright sale, political fiat, and a legislated "free homestead system."

The best of these would be an approximation of the free homestead system that was used to alienate the lands of the central plains (Neill, 2003: 12–16). Governments incur costs by maintaining the legal and economic substructure of an industry. Accordingly, governments have to extract from the profits of industry sufficient revenue to meet these costs. Generally, they do so through corporate profits taxes, personal income taxes, property taxes, and sales taxes. The more prosperous the industry, the greater the return to the government through these taxes. From this point of view, the most efficient structure of property rights in aquaculture would be the one that enabled the greatest economic development—a free homestead system.

Empirical evidence points to the superiority of a prior grant of minimally limited, court-protected property rights that is based on the fulfillment of conditions related to private and social economic development. Much of the great increase in the global production of marine food sources over the past 20 years has been associated with the growth of aquaculture—growth that has taken place largely in countries that have the strongest and best-defined property rights. As Anderson notes with respect to the wild fishery,

> As property rights are strengthened, and assigned to individuals, groups, cooperatives or communities, the effort to gain control takes on a different character. Efforts to reduce costs, increase efficiency, and to produce for the market intensify. Additionally, a longer-term perspective begins to appear. What should we then observe where this is the case? All else constant, we should observe changes in gear/fishing methods and timing of harvest, increased yield, new market development, increased quality, changes in industry structure, investment in productivity enhancing technology, and a tendency toward integration. (2002: 140–142 *passim*)

In fact, this has been the result of the limited introduction of property rights in the form of individual transferable quotas in the wild fishery (Leal, 2005: 6–13). How much more likely is it to be the result if full property rights were awarded in fish farming? With complete control of property, as Elizabeth Brubaker has suggested, self-regulation becomes possible—indeed, economically imperative—and this appears to be the case in practice. In Scotland, for example, where fish-farm leases tend to be larger than in other jurisdictions, fish farmers have practiced something like crop rotation, moving pens from one location to another to restore the health of pen sites.

The free homestead system should not be imported wholesale into the coastal regions or the open-ocean exclusive economic development zone of Canada. In its historical form, that system of granting full property rights assumed that the land was "empty"—that no damage or disutility would be incurred at the moment of the grant, and that there would be no collateral damage from development and no external costs. None of these conditions would be met in the context of contemporary Canadian fish farming. Adopting a free homestead system would not mean opening all of Canada's coastline to anyone who could afford to set up a fish farm. Some external disutilities and the rights of incumbents would

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have to be taken into account, and some limitation of ownership of the means of production would be in order. Sites would have to be off limits to aquaculture if they had had alternative uses that economically outweighed aquaculture, or if they were simply unsuitable for aquaculture. The industry itself would have to be protected from hopeless attempts at development. However, such limitations on rights based on usefulness to the whole of society should be embodied in the statutes in such a way as to leave them open to challenge in the courts, where basic rules of equity would be invoked. These rights should not be open to the hazards of media-fed passions in an often dysfunctional political system.

> Conclusion

Fish farms are providing an ever greater portion of the supply that goes to fish markets. While stocks in the wild are being depleted by overfishing, and expansion in the wild fishery is close to non-existent, the output of fish farms is expanding. Two major forces are driving this growth. The first is the demand for food, particularly in the developing world where populations are increasing, but also in the increasingly health-conscious developed world. The second is the application of science to the breeding and care of fish in the developed world. These two forces have come together in Norway and Chile and on the West Pacific Rim. Expertise is exported from the developed world, particularly from North America, to increase the production of seafood in the rest of the world.

North America neither lacks the waters suitable for aquaculture nor the technical know-how to make aquaculture competitive and profitable in the food industry. Rather, it lacks a government policy of development, as well as appropriate ocean space alienation and tenure institutions—that is, it lacks a set of property rights that will bring fish farming into the realm of normal, modern market activity. North America needs to follow Chile's example by granting explicit, court-enforceable property rights to holders of licences and sites.

Aquaculture will continue its rapid advance, even in North America. Technological advances and global market forces are driving its development and will continue to drive it in the future. However, without the introduction of property rights, called for by Elizabeth Brubaker over a decade ago, "fencing the seas" will take place only outside North American waters.

Fish farming is still an emerging industry. It is still not certain what the give and take of policy, law, and interpretation by the courts will produce as its legal framework, or, indeed, what its most efficient legal framework would be. Still, it is clear that the general direction of the industry's institutional evolution should be towards the creation of an appropriately articulated free homestead system of private property rights, failing which the following approximations would be in order:

- Fish farmers should have sufficiently secure leases and licences for lending agencies to support investment in water quality, equipment, and the breeding and health of fish stocks. For example, the federal government could auction off 99-year leases over the ocean surface and water column, building in appropriate conditions for environmental conservation.

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- The government's interaction with fish farming should be separated from its involvement in the wild fisheries. A separate, specialized and expert fish farming agency would be best. Alternatively, fish farming could be removed from the jurisdiction of the Department of Fisheries and Oceans and put under an independent agency within the Department of Agriculture.

- Politically biased policies should be replaced with rules of operations that are based on objective cost-benefit analyses. As the Commissioner for Aquaculture has stated (OCAD, 2001), at the very least, the precautionary principle that no action should be taken when there is risk of any harm whatsoever should be abandoned. Mistakes will be made, but they will also be corrected. This is an inevitable, healthy part of an emerging enterprise. The alternative is slow progress at best, and outright stagnation and obsolescence at worst.

Aquaculture does have external effects that impinge on alternative uses of its resources. But as Elizabeth Brubaker (1995) has shown, there is every reason to believe that fish farming will make a large positive contribution to society, and that the environment will be better protected under a suitable private property regime.

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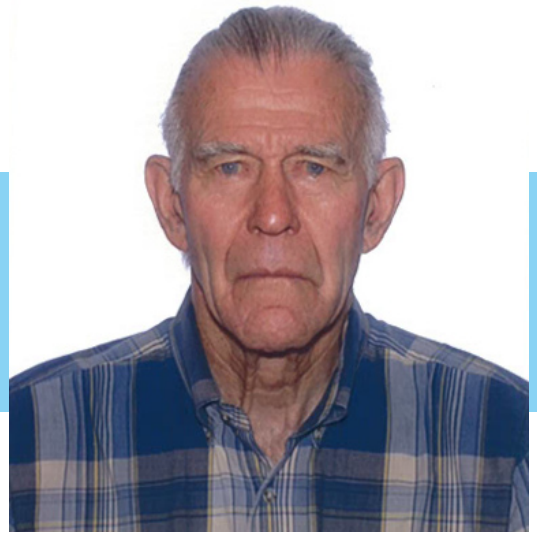

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