

Whose Fish? Science, Ecosystems and Ethics in Fisheries Management Literature since 1992

THE PERSISTENT ECOLOGICAL COLLAPSE of groundfish stocks that led to the fishing moratoria in Atlantic Canada in 1992 has prompted a steady stream of studies. Two related questions tend to define these works. The first asks who have benefited by past fisheries management, and how those benefits have affected fisheries management. The second question, emerging from the analyses of fisheries management, asks for whom the fisheries of the future should exist. In the answers to these questions two broad schools of thought have emerged. The first, associated with neo-classical economics, argues that “fishers” have had too much influence over past fisheries management. These people have pushed governments to allow them to fish without restraint and to deplete fish stocks. In future, governments should act for fish, not fishers, by privatizing the common property resource. The second school argues that the assumptions of the first are based on myths and misconceptions and that fisheries management has served the interest of a particular capitalist organization of the fisheries. This fisheries management encouraged the application of flawed scientific and industrial models to the study of fisheries and adherence to such models produced the crisis of over-fishing that continues to plague regional fisheries. Fisheries of the future must be re-embedded in the interests of coastal communities through new partnerships between fishers, fisheries scientists and fisheries managers.

Most of the essays in Ragnar Arnason and Lawrence Felt, eds., *The North Atlantic Fisheries: Successes, Failures, and Challenges* (Charlottetown, The Institute of Island Studies, 1995) leave no doubt that over-fishing caused the depletion of Atlantic Canada’s ground fisheries. The most important contribution to the collection, Jeffrey A. Hutchings and Ransom A. Myers, “The Biological Collapse of Atlantic Cod Off Newfoundland and Labrador: An Exploration of Historical Changes in Exploitation, Harvesting Technology, and Management” (pp. 37-93), makes it clear that environmental factors such as colder water temperatures could not account for the ecological catastrophe of 1992. Instead, these authors argue that from the 1960s on fishing effort produced rates of fishing mortality that were more than fish stocks could bear. More lethal trawling technology became prevalent, which in turn continued a process of intensification of fishing effort through the introduction of new fishing gear and vessels that went back to the very foundation of European fisheries in local waters. Such intensification masked periodic evidence of resource depletion that had been emerging since the mid-1800s and was an important factor in disguising the impact of Canadian fishing effort on fish stocks as Canada expanded into the 200-mile limit in the late 1970s and 1980s. Fisheries managers failed to realize the impact of this increasing effort because their knowledge of change in fish populations came from the application of overly-simplistic statistical models for estimating yields. Scientists applied these models by using commercial catch rate data to construct estimates of fish abundance. This commercial catch data gave fisheries scientists a better sense of the efficiencies of new fishing gear, but they chose to interpret the data as signs of fish-stock abundance.

Sean Cadigan, “Whose Fish? Science, Ecosystems and Ethics in Fisheries Management Literature since 1992”, *Acadiensis*, XXXI, 1 (Autumn 2001), pp. 171-195.

In their "Introduction" (pp. 11-35), the editors of this volume suggest that the crisis of over-fishing supports the view that the common property nature of marine resources makes them susceptible to the open-access problem of depletion. The editors accept the "tragedy of the commons" thesis about fish – the difficulty of controlling fish as private property forces fishing people to harvest without regard for conservation.¹ While new management techniques are available to solve the problems of fisheries, such technologies would create more productive and globally competitive fishing industries but would also lessen employment opportunities. As a result, the "social relations and customs" of coastal communities will have to change, despite the likelihood of social conflict (p. 26).

Other essays in this volume describe specific options for fisheries management in Canada, Greenland, Iceland and the Faeroe Islands, but they suggest few clear solutions to the fisheries crisis. David Cairns's essay on fisheries management on Prince Edward Island (pp. 95-133) argues that Atlantic Canadians will have to continue to rely on Canadian fisheries management although they might like to blame federal "mismanagement" for fisheries problems. The migratory nature of regional fisheries requires a corresponding larger management structure as provided by the Canadian Department of Fisheries and Oceans (DFO). Jógvan Mørkøre's examination of the Faroese fishing industry (pp. 135-67) points out that Faroese control over their fisheries, coupled with a nationalist development strategy, led to critical resource depletion through over-capacity. The Faroese are now looking to some form of European Union membership to revitalize their fishing industry.

Other studies suggest that federal influence may be a problem. Sigfús Jónsson's comparison of Newfoundland and Iceland (pp. 267-86) suggests that Newfoundland's dependence on transfer-payment funded government services and social supports may have prevented it from developing a robust fishing industry such as Iceland's. Ragnar Arnason argues that Iceland's political independence, combined with socio-economic dependence on a limited natural resource base, has meant that its people have been more hard-working and productive than Newfoundlanders. Iceland's more nationalistic expansion of its marine-resource base has further meant that its fishing industry has performed better than Newfoundland's and has contributed to a stronger economy generally (pp. 237-66).

Some essays explicitly criticize state support for fishing communities in Atlantic Canada. They raise as many questions as they answer. Lawrence F. Felt and L.W. Locke, for example, blame federal and provincial industrial and social policies for over-capacity and resource depletion in the Newfoundland fisheries since the 1970s (pp. 197-235). The authors are optimistic that more efficient and productive future fisheries will contribute to the revitalization of rural Newfoundland and Labrador. While Felt and Locke feel that such fisheries will have to employ far fewer people,

1 There are two problems with the "tragedy of the commons" approach. The first is an assumption that people are Hobbesian competitors who act reasonably only under the auspices of a strong, centralized authority. The second is the practice of seeing property as a thing, rather than a relationship based on the recognition of rights to something and the exclusion of others from that thing. These criticisms are well developed in another important contribution to the literature on the fisheries crisis: David Ralph Matthews, *Controlling Common Property: Regulating Canada's East Coast Fishery* (Toronto, 1993). I reviewed this book in *Labour/Le Travail*, 34 (Fall 1994), pp. 321-23.

they suggest only vaguely that import substitution in fisheries-related work might help absorb marginalized workers. The authors discuss federal experiments with quota management to reduce fishing capacity, as well as the fear that such allocations will begin the process of concentrating quotas in the hands of a few fishers or in the hands of a few corporations. While acknowledging such fears, Felt and Locke take no position on the debate.

Other essays in this collection make it clear that rationalization of fisheries does mean that the people of rural fishing communities have much to worry about. In Greenland, for example, Ragnar Arnason and Peter Friis (pp. 169-95) have found that individual transferable quotas (ITQs) have lessened employment in the ocean-going fleet by reducing capacity, and they favour an extension of this more efficient system to the inshore fisheries. Arnason and Friis present no ideas about how employment levels in fishing communities may be maintained, except by brief allusions to the possibilities of more value-added processing, diversification of harvesting and support for their activities from the EU. Arnason's discussion of ITQs in the case of Iceland is explicit in stating that a more productive fishing industry is one that is smaller in terms of the number of people employed (pp. 237-66).

Arnason's and Felt's conclusion takes no position on ITQs or other quota systems, but they feel that "some form of privatization appears to be the favoured strategy for removing excess capacity in harvesting and is likely to be extensively implemented over the next few years" (p. 292). A fuller vision of the fisheries of the future based on the conversion of common property into private emerges from the essay collection edited by Brian Lee Crowley for the Atlantic Institute of Market Studies (AIMS), *Taking Ownership: Property Rights and Fishery Management on the Atlantic Coast* (Halifax, AIMS, 1996). Crowley's introduction argues that private property rights must be introduced into the fisheries by an ITQ regime. In his view, fisheries have been depleted because no one has a commercial interest in their preservation, and because their current costs of regulation are too high. While the Canadian government has much constitutional power to regulate the fisheries through the DFO, it derives no direct profit from their sound management. Instead, the government profits politically by votes from fishing communities if it allows them to have more access to fish without regard for conservation. Existing regulations consist largely of licences that limit the time of fishing and/or types of fishing gear used. Such limits encourage fishers to race to fish as much as possible within their constraints, and they provide incentives for cheating. The solution is what Crowley terms "rights-based fishing", or fishing based on the private-property rights of ITQs.

Crowley bases his views on Anthony Scott's essay (pp. 99-144), the main argument for ITQs in this collection. Governments "scientifically" estimate the total allowable catch (TAC) that each stock can "sustain". They parcel out shares, or quotas, to individuals or enterprises so that they may be used or exchanged. The guarantee of this ITQ means that fishers no longer have to compete ruinously: "The ITQ acquires a value in the market and becomes, like a farmer's land, his chief capital asset. Harvesters have an interest in cooperating to build the stocks, because each will benefit from increased catches in the future, not least because the present market value of each ITQ will rise with the potential future value of the stocks" (p. 4).

Most of the essays in *Taking Ownership* advocate forms of property rights based on models of how fishing has worked in the past and present, and how it should work

in the future. As presented, these models do not have much descriptive integrity, as the models are not based on sound observation of actual historical phenomena. Scott's discussion of the benefits of ITQs, for example, rests on a confidence in the ability of fisheries science to recommend safe levels of TACs that is not warranted by the observations of Hutchings and Myers. Furthermore, his hypotheses rest on abstractions about fishers. Scott suggests that all fishers behave in the same way as self-interested profit-maximizers. Ragnar Arnason suggests that the development of ITQs is inevitable because fisheries are simply part of an overarching historical framework for global economic development based on private property rights. Arnason is not interested in the nature of property as an historical process. Consequently, he is quick to suggest that ITQs have produced real benefits in countries such as Australia and Iceland, but he does not spend much time discussing who enjoys the benefits and who pays the costs associated with those who get the benefits.

R. Quentin Grafton's essay on the manner in which ITQs and other allocation systems have worked in some Atlantic Canadian fisheries is more concerned about those who win or lose by the introduction of property rights. He notes the concerns of some fishers about reduced employment levels and their fears that transferability may mean that many communities will lose any right to benefit from fish caught in adjacent waters and on which they have depended historically. Grafton's answer to the first concern is that overall quotas can be spread thinly among everyone, so that many fishers will make a voluntary decision to get out of the fishery. Governments could regulate the conditions under which transfers of quotas would work, although he fears that this would encourage the maintenance of "unviable" small-scale fisheries (p. 174). Donald Leal's study of various international cases of self-managed or community-managed fisheries argues that quotas need not be made transferable or individual in order to solve the access problems that have led to fisheries depletion. Leal argues that most communities' histories suggest that they have the cultural capacity to develop customs that prevent profit-maximizing and selfish behaviour. Governments could better manage fisheries by working with such cultural capacity. While Crowley presents Leal's essay as an indicator of "vigorous intellectual and practical debate" among fisheries management theorists, he is quick to point out that Leal's suggestion about the importance of community and culture "is met with scepticism by those who see these ties as an inadequate basis on which to build successful fisheries" (p. 5). Gordon R. Munro's application of game theory to international management regimes for deep-sea fish populations or those that straddle international boundaries, considered in the light of Leal's arguments, suggests that quota rights may be the only solution to fisheries that are beyond the reach of historical community dependency.

Some of the essays in *Taking Ownership* are almost Orwellian in their disturbing visions of the future. Arnason, for example, suggests that ITQs depend on science and technology to work as promised, but that existing forms are too expensive to be practical, particularly in enforcement (p. 142). William Apold and Stanton Guy suggest that governments must respond by the creation of more extensive, accurate and centralized databases that will allow better monitoring of the behaviour of quota holders and scientific recommendations about TACs. Fishers must be more carefully monitored and audited, but these expensive tasks can be "provided by accredited

private companies that are selected through open bidding” (p. 301). The costs of using people to keep fishers under surveillance can be reduced by deploying global positioning systems, electronic fishing logs and video monitoring, and by installing monitors in processing equipment on board fishing vessels.

Elizabeth Brubaker sees private property rights and surveillance as means to allow better fisheries management through litigation. Courts in the Anglo-American world award damages based on the ability of a litigant to prove that she or he suffered direct costs. In the case of the over-exploitation or pollution of “common-pool” resources such as water, air or the creatures of land and sea, the lack of valuation associated with the assets of private property makes it difficult for individuals to assess the direct costs of their damage. In turn, this makes it impossible for courts to assess damages generally, and therefore to assign costs that over-exploiters and polluters would have to bear. Furthermore, as established by the Supreme Court of Canada in a famous 1970 decision concerning pollution from a phosphorus plant in Placentia Bay, Newfoundland, individuals cannot claim, and therefore sue for, “peculiar” damages of property held in common. The privatization of everything would eliminate the legal impediments against assigning costs to polluters and depleters. Brubaker notes that most individuals will not be able to afford the costs of gathering evidence about pollution, especially to prove causation in circumstances where there are many potential sources. She suggests that “technological advances” will lower costs (p. 222), but fails to address the current inequalities of access to the legal system that will limit fights over damages to those who can afford the costs of courts and lawyers. More disturbing is her failure to consider that the legal assignment of damages may establish a cost of doing business, as much as a prevention of resource pollution or depletion. The legal system would provide only for the payment of damages for this abuse. Should litigants negotiate a satisfactory payment structure before a case went to court, then the abuse might continue. Should a polluter or depleter decide that the opportunity costs of damages are lower than the gains of such activity, they will likely persist despite continued litigation. Finally, litigation will occur under conditions of the imperfect measurement, understanding and assignation of costs of pollution or depletion of resources. There is no way to assess accurately damages under conditions of such ignorance, even if private property rights did exist in all fisheries.

Michael Harris, *Lament for an Ocean: The Collapse of the Atlantic Cod Fishery, A True Crime Story* (Toronto, McClelland and Stewart, 1998) supports private-property advocates’ notion that the common property nature of the fisheries led to their collapse. While Harris accepts the notion that too much fishing led to resource depletion, he blames federal fisheries managers and politicians for being too gutless to face the political consequences of reducing capacity in the fishing industry (p. 97). Harris argues that governments have always used fisheries and related income-support programmes to create short-term employment. Unwilling to accept that sound fisheries management must reduce capacity and employment to be ecologically sustainable, by the 1980s fishers have supported politicians who liked to deflect blame for over-fishing on foreigners. Consequently, Harris writes, DFO “became a specialized social welfare department in which the biology of fish and the conservation of stocks were often afterthoughts” (p. 71). Government-employed fisheries scientists abetted politicians in disguising the fact that short-sighted development policies were leading to resource depletion and in fighting against

scientists from the academic community who criticized flawed techniques for estimating stock size and fishing mortality. The big fish companies get some of the blame from Harris, but for the most part he portrays them as voices of reason who, unlike most politicians, recognized that over-capacity had to be dealt with.

Harris suggests that federal authorities would have been better off pursuing the “Oslo Option” – acting quickly, as had the government of Norway, to close the cod fisheries at the first sign of imminent fish-stock collapse. Instead of following the Norwegian model in facing down public pressure to keep the fisheries open, the Canadian government bowed to provincial and industry pressure to allow the depletion of fisheries to continue. Harris believes that the compensation packages developed by the federal government to deal with the moratoria are new examples of its unwillingness to force people out of the fishing industry. As well, governments’ commitment to the expansion of new fisheries threatens to replicate the crisis of northern cod. In a brief seven pages at the end of his book (pp. 325-32), Harris offers some interesting ideas about the need to combine a community-based approach to fisheries management with economic diversification to solve the problem of fisheries management. But compared to the more than 300 pages cataloguing the supposed political irresponsibility of bowing to community pressure in the past, these suggestions are not calculated to inspire confidence.

Raymond B. Blake, *From Fishermen to Fish: The Evolution of Canadian Fishery Policy* (Toronto, Irwin Publishing, 2000) offers the same analysis as Harris’s book, but without the same detail. Although Blake maintains that it is too simplistic to explain fisheries crises by managerial failure on the part of DFO, foreign over-fishing or domestic over-fishing, his own argument accepts the tragedy of the commons thesis. Fisheries depletion happened because Canada and other fishing nations tried to manage their marine resources to serve the interests of “fishermen” rather than fish (pp. xv-xvi). While Blake acknowledges that the rise of new forms of international industrial fisheries associated with the introduction of steam-powered vessels and freezing technologies in the early 20th century “contributed greatly to the destruction of fish stocks, not only along Canada’s east coast but throughout the world” (p. 27), he accepts these fisheries as inevitable because of their efficiency and productivity. Canada had no choice but to adopt them to meet international competitors on the same terms. Furthermore (although Blake presents no evidence of this), Canada was really acting in the best interest of fishers, and at their behest, to improve their standards of living. The real problem of resource depletion was that most of the fishers who could not find employment in that modern industrial sector of the fishery failed to accept marginalization as their fate and inconveniently insisted on finding employment in small-scale fisheries. Canadian fisheries managers failed to accept numerous government reports that argued that the exploitative capacity of the industrial fishery made most fishing people unnecessary, and that fishing should be centralized in a small number of communities, employing far fewer people. Hampered by “humanitarian and social concerns”, the federal government refused to cut employment in the fishery and instead provided various forms of income support to people who stayed in the small-scale inshore fisheries (p. 62).

Blake interprets Canada’s entanglement in international fisheries disputes, whether over Atlantic groundfish or Pacific salmon, as a result of the inability of federal governments to make the tough choice to down-size domestic fisheries. Far better,

instead, to expand the resource base over which Canada had jurisdiction and to blame over-fishing on foreigners. Blake tends to exonerate Canadian policy makers for their role in fisheries expansion by saying that they were only doing what other countries were doing. Nonetheless, he does point out that policy makers contributed to the politicization of fisheries science and the destruction of marine resources by refusing to end the social support of fishing communities and reduce employment in the fishing industry. In the end, fisheries crises are the result of the inherent failure of liberal democracy: “the politicians and civil servants who presided over the DFO in the late 1980s and early 1990s” did not have “the fortitude” to face “the political repercussions” of marginalizing most of the fishing peoples of Canada (p. 89). The solution, apparently, is for the Canadian government to stop social support for fishers that encourages them to remain in the fishery and to introduce “rights”-based fishing by privatizing marine resources through something like an ITQ regime.

There are analyses that do not accept market or private property solutions as the best way to deal with fisheries crises. Raymond Rogers, *The Oceans are Emptying: Fish Wars and Sustainability* (Montreal, Black Rose Books, 1995) argues that Canadian fisheries management failed because management practices and public policy privileged large-scale, industrial capitalist development of the regional fishing industry over the conservation of fish resources. Rogers argues that there is no way to conserve nature in an economic system that rests on the need to accumulate capital, a process of converting living things into a “dead thing” (p. 20). In this view, the logic of capital accumulation is incompatible with the sustainable use of nature. If we remember that marine biotic communities, like any constituent parts of an ecosystem, represent complex flows of energy from one part to another, and that systems are destabilized by the sudden or persistent addition or withdrawal of energy, then capital accumulation, along with its ideological shroud of market rhetoric, must be seen as a major force for destabilization. The economic development of marine resources always results in the withdrawal of energy, in the form of rent generated by the fishing industry. There are no proven ways in which such rent may be used to re-invest in the productivity of marine ecosystems. Market considerations, in any event, will lead capitalists to invest the rent generated by fishing into completely different economic sectors should opportunity costs be low enough to encourage such.

Rogers suggests that the fisheries management disguises its service to capital accumulation as resource conservation in two ways. First, fisheries managers have persistently claimed that sustainable use of marine resources may only proceed through the development of property rights that will make resource conservation a market priority for participants in the fishing industry. This claim is based on the tragedy of the commons argument as put forward by the proponents of ITQs. The problem with such claims is that most of the increasing effort that has led to the current crisis of the Atlantic Canadian fishing industry has come from the newer, more “Fordist” industrial sector (the large-scale, highly routinized and specialized sector that includes fishing companies such as Fisheries Products International and National Sea Products) that federal and provincial policies have been designed to promote, not to restrain. Governments have argued that this sector’s greater efficiency, or its ability to reduce the overhead costs of labour in the industry, are essential to global competitiveness. At the same time, governments have refused to accept responsibility for finding alternate employment for marginalized fishers and

have had a half-hearted commitment to controlling access to fisheries through quota and licensing regulations. Instead, the federal government pursued aggressively the control of foreign fleets' access to Atlantic Canadian waters, first by the establishment of the 200-mile limit, and then by attempts to control foreign fishing on areas of the Grand Banks outside that limit. The primary motive behind Canada's international fisheries policy has been to secure control over greater amounts of marine resources to encourage Canadian industrial development, not to conserve fish. As well, Canadians have embraced the luxury of blaming over-fishing on foreigners rather than accepting that they are part of a more invidious capitalist system's inherent tendency to destroy the natural world.

The second disguise of fisheries management is fisheries science. Rogers points out that the federal government's scientific monitoring of fish stocks was most developed during the period of the most acute overfishing from 1977 to 1989. Fisheries science has proven useless, not because it has been inadequately supported, but because its goal has always been to calculate the most extreme rates of exploitation that marine resources could bear in order to sustain economic development. Fisheries science has been little more than "a kind of service industry providing information about the availability of raw material to industry so that it can do long-term financial planning" (p. 102). Fisheries scientists have run through various "bioeconomic" models designed to calculate safely the outermost range of exploitation, from Maximum Sustainable Yield through newer adaptive population models, but none have been able to provide the certainty that economic development has required. When in doubt, policy makers have always used scientific advice to assume that the highest estimates of "safe" fishing effort were indeed safe, allowing the needs of economic development to overshadow the interest in resource conservation.

Rogers's work would be more convincing, however, if it rested on a better historical analysis. Largely a work of sociological theory, *The Oceans are Emptying* is based on an understanding of the history of fisheries development limited to Harold Innis's classic early study, *The Cod Fisheries* (1954). As a result, Rogers explains the crisis of the fisheries through a technological determinism that begins in the 1920s and 1930s. The over-exploitation of fish becomes more a problem of trawlers and telegraphs than of the social and economic relations of capitalism itself. Rogers clearly does not believe this, but the abstract level of his analysis tends to lead back to this determinism. His main criticism of various quota-based systems of introducing property rights into the fishery, for example, is that "conservation is doomed to failure if all the modern economic and technological realities are allowed to be present in the exploitation of the natural world, and then are suddenly expected to cease operating when a specified catch level is reached" (p. 89). Rogers would be clearer on this point if he presented empirical evidence of the manner in which heavy investments in fisheries technology may lead to fishing without regard for conservation.

Although more historical in analysis, few of the essays in James E. Candow and Carol Corbin, eds., *How Deep is the Ocean? Historical Essays on Canada's Atlantic Fishery* (Sydney, University College of Cape Breton Press, 1997) help in understanding the problems of the Atlantic Canadian fisheries. No theme unites the essays in this collection, despite the editors' suggestion that the social, economic, political and ethical dilemmas of the ecological catastrophe in regional fisheries

require consideration of the importance of the fishery to the region. Three authors address directly the problems that have led to the current crisis in Atlantic Canadian fisheries. Miriam Wright points out that post-war Canadian fisheries policy reflected ideological value judgements about the 'backward' traditionalism of the region's older saltfish industry and fishing communities and the progressive modernity of the large-scale, industrialized and centralized fresh/frozen fish industry (pp. 195-205). Barbara Neis suggests that concepts of science embedded in the ideology of modernization excluded fishers' traditional ecological knowledge (TEK) from the discourse of official science (pp. 243-60). A careful examination of this TEK reveals a local knowledge no less anecdotal or decontextualized than the "scientific" data of a few DFO survey trawls or data from commercial harvests. To the contrary, Neis points out, partially as a result of being generated through a daily process of working in the industry, fishers' TEK may be better positioned to flesh out the detail of local variation in changes in fish stocks, and in the relationship between such changes and variation in specific fishing practices. More importantly, TEK reveals the complexity of fishers' own behaviour as individuals and as members of communities. Much of their knowledge reflects local practices and concerns that suggest that fishers may not be characterized as inherent open-access squanderers due to the common property nature of the resources they use. Donald Harold Steele and Raoul Anderson reveal that official science failed to protect important 1986 and 1987 year classes of cod from over-exploitation through over-estimates of abundance (pp. 261-67). Such over-estimates reflect the imperfections of fisheries science, but also the unwillingness of scientists to consider the validity of important anecdotal information about fishing practices such as high-grading. Fisheries scientists' failures often come from their refusal to engage seriously in each others' arguments, and their inability to understand fisheries ecology stems partially from their unwillingness to consider the behaviour of fishers as well as fish.

Because of its collaborative and comparative approach, Richard Apostle et al., *Community, State, and Market on the North Atlantic Rim: Challenges to Modernity in the Fisheries* (Toronto, University of Toronto Press, 1998) is one of the best analyses of the problems in Canadian fisheries management. Scholars of the Canadian fisheries – Apostle, Gene Barrett, Leigh Mazany and Bonnie McCay – teamed up with scholars of Norwegian fisheries – Petter Holm, Knut Mikalsen and Svein Jentoft – to address the core question of whom exactly fisheries exist to serve. The authors' answer is that fisheries exist properly to serve the needs of the communities which depend upon them. This service has always had an uneasy existence within the market relationships of the commercial fishery. These market relationships, not the common property nature of fish resources, have produced the conditions under which open-access depletion of fisheries have occurred: "The tragedy, therefore, as it is now unfolding in North Atlantic fisheries, is not so much a tragedy of the commons as a tragedy of management failure and community failure" (p. 6).

Apostle and his collaborators accept that economic globalization has changed the nature of fisheries organization in both Norway and Canada. However, they reject the notion that the only way the fisheries may develop further is through a process of resource privatization and capacity reduction. Managers have become more committed to market mechanisms, not because such meet the needs of fisheries, but because these mechanisms conform to an unfounded ideological commitment to

modernity that promotes the market as an agent of rationalization and control. Such mechanisms further conform to policy-makers' belief that cheaper management tools are usually better. Like Rogers, these authors demonstrate that Canadian fisheries management has failed to conserve fish resources in two ways. First, state support of the Fordist tendencies within the industrial organization of the fishing industry created much of the over-capacity and the open-access problems that led to depletion. Second, much of the current crisis in fisheries has been demonstrated hubris about the ability of "fisheries science" to calculate certainly the fullest limit to which fish stocks could be sustainably exploited. Fisheries science has proven time and again incapable of such certainty, and it has also proven susceptible to interference from the political and economic pressures of dominant interests in the fishing industry.

There are two particular elements worth emphasizing about this work. The first is that the comparative approach suggests that the Fordist imperative in fisheries development and management in Canada was neither an inevitable nor a logical response to the common property nature of the fishing industry; rather, it was a capitalist response to specific political and institutional conditions. In the Norwegian case, the unitary and centralist nature of state organization, combined with the advent of Labour governments in the early decades of the 20th century meant that fisheries reform resulted in "a complex corporatist structure, in which the petty-capitalist fishermen had a privileged position and from which they dominated the sector" (p. 30). Norway faced the same post-First World War depression in the fisheries that plagued the Maritimes and Newfoundland. However, the Norwegian state proved more willing to legislate fishers' control over prices in their marketing relationships with merchants and to prevent merchants from investing in more capital-intensive technologies that would allow them to compete with small-scale fishers in the production of fish during the 1930s. In Newfoundland, during the same period, governments showed little commitment to regulating fisheries at all, let alone in a fashion that would challenge the well-entrenched power of merchants in the industry. In Nova Scotia, merchants in the saltfish trade opposed the introduction of new technologies such as steam trawlers and overshadowed fishers in the early and successful struggle against these. The merchants influenced provincial governments, which, in turn, pressured the federal government into limiting the introduction of steam trawlers. In the long term, federal authorities, who had the most responsibility for fisheries regulation, simply associated such provincial pressure with the supposedly backward traditionalism and provincialism of the region and its salt fishery.

The principles of collective organization and bargaining, protected by the social democracy and corporatism of the Norwegian state, allowed Norwegian fishers to resist mercantile experiments with investment in Fordist fishing enterprises. Norwegian fishers were not traditionalists; they saw the advantages of new technologies and specialization of production in the global fish markets of the second half of the 20th century. Capitalist development remained at the small-enterprise scale, while fishers who could not specialize tended to succumb to their more competitive counterparts. In Atlantic Canada, on the other hand, the federal and provincial governments emerged as strong proponents of large-scale fisheries industrialization to meet the growing demands of the emerging American fresh and frozen fish markets. Fishers had little organizational basis for opposing industrial

development. The structural rigidities of intensive capitalist development and the lack of available alternate sources of employment meant that governments were willing to develop policies that supported small-scale fishers.

Capitalist development in Norway and Canada produced over-capacity. Governments in both countries tried to mitigate the impact of such over-capacity by expanding their jurisdiction over fish resources internationally through Exclusive Economic Zones through the 1970s and 1980s, and by attempting to control domestic effort through quota regulations and licensing systems. Both forms of capitalist development foundered on a similar if unfounded commitment to the predictive power of fisheries science. The resulting development of individual vessel quota systems in both countries ironically undermined the Norwegian state's commitment to protecting petty-capitalist fish marketing. Despite the weakened position of petty-capitalist production in Norway, IQ and ITQ management do not have the same legitimacy as they do in Canada. This difference is explained by the combination of social democratic traditions and the centralized state's commitment to dealing with regional, technological and economic rivalries among fishers through a formal consultative process. In Norway the inclusion of fishers' organizations and environmentalist groups in fisheries regulation has resulted in broad support for fisheries regulations among the population.

This consultative process, rather than any greater political integrity, helps to explain why Norway could respond to fisheries crises faster than could Canada. In Canada, the complexities of government jurisdiction have meant that the federal government defended its jurisdiction by developing a more directed process of consultation with other levels of government, and most particularly with fishers' organizations. The more complicated nature of the Canadian state has led to a much more costly regulatory system, and the greater lack of legitimacy of state policies among fishers has added to enforcement costs. The result has been that the federal government, through DFO, has been much more receptive to the notion that it can best manage fisheries by devolving responsibility for most management on to market mechanisms through IQs and ITQs. Norwegian fishers have accepted the need for quotas to limit the problem of over-capacity but, through the formal consultative process, have made it clear to the Norwegian government that they see the transferability of ITQs as a threat to community and regional development. Small-scale fishers in Atlantic Canada have no comparable means for doing the same.

The second important element in this collection is the suggestion that communities must remain as an essential part of fisheries management. The authors make this argument both as a matter of social equity and because community embeddedness will make fisheries more competitive in local markets. The transnational corporate structures of Fordist industries, they argue, mean that these enterprises are disembedded in terms of the local communities whose fish resources they exploit. Petty-capitalist producers tend to be more embedded by virtue of their personal and cultural ties to others in their communities. Petty capitalists maintain the goals of capital accumulation as an imperative, but they are far more dependent on local resources and economic opportunities and far less mobile than large corporations should local resources and/or opportunities be undermined. The authors suggest that the failure of the Norwegian path of fisheries development was a result of crises of over-specialization and over-capacity that are in the nature of modern capitalism

itself, not because the Norwegian fisheries remained more embedded in community development. In the Canadian case, most of the investment in large-scale industrial fishing grew as a result of capitalists' and resource managers' faith in the inexhaustible nature of marine resources. Depletions of specific species have demonstrated that these powerful means of exploitation cannot simply, profitably or sustainably be unleashed on other species. Fishing industries must be capable of the more flexible adaptation of which smaller-scale enterprises are capable. ITQs represent only an improvement on the ability of corporations to divest themselves of locality. Their larger patterns of specialization tend to mean that they will prefer to gut resources and move on in a pattern of sequential homogeneous specialization.

Although written largely independently of the work of Richard Apostle and his collaborators, the essays collected in Dianne Newell and Rosemary E. Ommer, eds., *Fishing Places, Fishing People: Traditions and Issues in Canadian Small-Scale Fisheries* (Toronto, University of Toronto Press, 1999) offer much to support the view that many of the problems in Canadian fisheries management stem from the Fordist structure of the industry. Whether resource use, policy and/or conservation, fisheries-related activities have been disembedded from the communities that have historically depended on fishing. The editors point out that the commercial pressures of integration into external markets, not the supposedly inherent nature of fishers themselves, have been the crucial determinant in the long-term course that Canadian fisheries have pursued. The essays in this collection suggest that market integration disturbed many local cultures and economies in such a way as to worsen the open-access problems of fishing. The "widening of the resource 'management world' from the community to the state (provincial and national)" (p. 3) led to public policies that were unresponsive to communities, a supporting "official" science establishment that would not use the insights of local ecological knowledge and the development of technologies and industrial-capitalist relations that have unleashed the possibility of widespread ecological catastrophe. All of these developments are part of a wider historical process that cannot be understood by the tragedy of the commons view.

The essays in the Newell and Ommer collection examine complex issues from interdisciplinary and multidisciplinary perspectives. One prominent theme deals with historical analyses of the relationship between the market, the state, local communities and patterns of resource use. Ommer suggests that Newfoundland outports had been pre-industrial communities based on fairly egalitarian informal and formal economic exchanges of goods and services (pp. 17-31). Outport people used various forms of land and sea tenures to exploit local natural resources, but primarily for the use and survival of the community itself. Commercial exchange with the wider world of fish markets was necessary, but it was mediated by the mutual, if unequal, local reciprocities of relationships with local merchant firms. Post-First World War economic depression and state efforts at industrial promotion and regulation destabilized outport communities and, by undercutting the older "pluralist household economy" and replacing it with the large-scale, industrial, offshore fishery, created the conditions for over-capacity in the fishing industry and the depletion of fish stocks. Jean L. Manore and John J. Van West use oral history to establish the means by which fishers at Grand Bend, Ontario developed local fisheries management practices and exclusive usufructary property rights based on the pound nets they used in the Lake Huron fisheries. These nets required access to particular types of beaches

adjacent to shallow water (pp. 55-79). Like Manore and West, Sean Cadigan has found that fishing people, in the case of 19th-century Newfoundland, were aware of the need for the regulation of access to fish as common property resources (pp. 147-69). Unlike Ommer, Cadigan suggests that the process of undermining this commitment to communal forms of resource tenure began much earlier. Fishing people were aware of the potential for fisheries depletion in the expansion of fishing effort throughout the 19th century.²

Another prominent theme addresses the relationship between science and fisheries management, particularly between various forms of knowledge. Peter J. Usher and Frank J. Tough have found that Manitoban scientists and fisheries managers have consistently failed to manage sturgeon stocks properly because they did not include Cree subsistence fisheries in their monitoring of commercial fishing effort and because they would not consider local ecological knowledge about the stock complexity of the river (pp. 193-216). As Cadigan found in the case of the 19th-century Newfoundland fisheries, state managers have tended to assume that market factors such as prices, rather than depletion of fish stocks, have accounted for historical fluctuations in catches. Marimar G. Villagarcía, Richard L. Haedrich and Johanne Fischer, who are respectively marine biologists, oceanographers and population ecologists by training, found clear evidence of stock depletion in their multivariate analysis of two series of sampling data collected by DFO since 1971 for the fishing areas of the Grand Banks and northeast Newfoundland shelf (pp. 239-59). Despite some evidence for changes in the “local oceanographic climate” such as colder water temperatures, these three fisheries scientists conclude that “unrelenting overfishing” can be the only valid explanation for such depletion. Environmental changes are conditions that fish populations have encountered and adapted to in the

2 I develop these ideas further in Cadigan, “The Moral Economy of the Commons: Ecology and Equity in the Newfoundland Cod Fishery, 1815-1855”, *Labour/Le Travail*, 43 (Spring 1999), pp. 9-42. The introduction of new fishing gears troubled fishing people, who saw such gears as a response to localized depletion of fish. They demanded that governments regulate fishing gear to protect fish. Time and again, governments refused to act because they, like many merchants, felt that new technologies were essential in finding new fish resources to exploit. Newfoundland authorities hoped that new fishing technologies would maintain fish exports and, in the long run, provide the capital for investment in economic diversification. Investment in new fishing technologies and the spatial expansion of fishing effort produced temporary recoveries in fish exports, but the overall trend from 1825 to the end of the 19th century was for exports to stagnate, or even decline, as fishing effort grew. When faced with evidence that fish resources might be suffering as a result of the pattern of development in the fishing industry, the government preferred to blame foreigners for any signs of depletion (a tactic that was to become all too popular in the 20th century). Many fishing people continued to oppose the increasingly intense exploitation of fish resources throughout the 19th century. Their growing poverty undercut the ability of fishing people to maintain their opposition to the intensification of marine-resource exploitation. If fishing people could not get credit directly from merchants because they would not adopt new fishing methods, they faced only two choices in the absence of government regulation of access: they could either adopt the new methods or, if they could not afford this, go to work for those who could. In either case, people’s livelihoods would come to depend on accepting a more open-access condition in the fishery. Once fishers adopted a more capital-intensive gear, the pressure to exploit resources more severely took over. Fishers had to work harder and longer to pay off the debt incurred as a result of investing in new equipment and larger vessels. The construction of more wide-ranging vessels also meant that fishers increasingly intruded on each others’ fishing grounds, making the possibility of community self-management less likely.

past; only over-fishing can explain the current catastrophe. This essay constitutes an open intervention against a favourite public position of the Newfoundland region of DFO – that climatic change suddenly accounted for the collapse of northern cod.

Jeffrey Hutchings examines the politics of stock assessment in his study of “The Biological Collapse of Newfoundland’s Northern Cod” (pp. 260-75). Although he follows the convention of terming stock status assessment as a science, Hutchings notes that fisheries science is properly the “body of work intended to provide information on the biology and population dynamics of harvested fishes”. Stock assessment has a more specific purpose: the estimate of past, present and likely future abundance and mortality rates of fish populations using commercial catch data and research surveys (p. 261). Hutchings demonstrates that northern cod collapsed because of the consistent DFO over-estimates of abundance and the resulting allowance of over-fishing. Over-estimates happened because fisheries managers failed to take into account uncertainties in estimates and dissent among fisheries scientists about the meaning of data, and because scientists tend to work within compartmentalized “boxes” related to fishing impacts, fish biology and environmental factors. Stock assessment within DFO, in other words, has not been good science. In another essay, Haedrich, Barbara Neis, Lawrence F. Felt and David C. Schneider argue that scientists must engage in new methods of fisheries management through “An Interdisciplinary Method for Collecting and Integrating Fishers’ Ecological Knowledge into Resource Management” (pp. 217-38). They argue that fisheries scientists must find a way to build in the traditional ecological knowledge of people about their environment that arises from the occupation of a place and use of its resources over time. The fishers’ trade means that they have acquired substantial TEK about fisheries ecology. As well, people have often created “indigenous or traditional management systems” to control access to fisheries. The authors outline an interview methodology for collecting TEK, sampling guidelines that will allow for the “complex range of factors that probably influence fishers’ TEK” such as gender, age, social status, and media exposure, and they provide a sample research framework based on their work in Newfoundland. The engagement of TEK with more conventional knowledge would allow the better development of fisheries management goals in several respects: better allocation of marine resources for exploitation and conservation purposes; the articulation of more complex and sensitive hypotheses that can be tested by conventional scientific methods; and the incorporation of more refined understandings of fishing behaviour into stock assessment.

Finally, there are essays that address the relationship between state policy and the fate of communities that have been based on fishing. Barbara Neis’s “Familial and Social Patriarchy in the Newfoundland Fishing Industry” (pp. 32-54) is an important reminder, in the context of the collapse of fish stocks, that state policy has contributed to more than economic, ecological and environmental problems among the people who have depended on fisheries for their livelihoods. Neis traces the manner in which state policies have transformed the familial patriarchy of rural Newfoundland and Labrador into a social patriarchy. While women’s and children’s labour was essential to the pre-industrial household fisheries, men controlled access to most resources, and the state supported male authority over the household. Although the development of industrial fishing in the 1950s provided new economic opportunities for women outside the household in fish processing plants, state policies ensured that they would

still be subordinate. Provincial legislation established that women's minimum wages were lower than men's, and federal unemployment insurance regulations would not recognize the work of women in family fishing enterprises. While widows, or women who had male relatives who could not earn much in the fisheries, had little choice but to work in the plants, downturns in the fishing industry forced other women out of family enterprises in search of insurable earnings. The net effect was that women served as a cheap labour supply for the processing industry under the assumption that their primary role was as household caregivers. By the 1980s women had begun to challenge successfully some of this regulatory discrimination, and the deepening economic crisis of the fisheries through the 1990s led more women into fishing alongside male relatives. The state's commitment to professionalization of the fishery, however, by awarding licences and quotas based on historical, patriarchal patterns of fishing, will likely entrench social patriarchy, as have discriminatory compensation packages for people affected by fishing moratoria.

The manner in which state policies have affected Aboriginal fishers is another important contribution of the Ommer and Newell collection to the literature on fisheries management. Tough's analysis of government licensing policies and the capital requirements of the 19th-century commercial fisheries in Lake Winnipeg suggests that the economic marginalization of Aboriginal fishers went hand-in-hand with depletion of sturgeon and other species (pp. 97-120). Arthur J. Ray establishes that provincial and federal regulations governing the freshwater fisheries of the old Hudson's Bay Company hinterland have consistently tried to re-interpret Aboriginal customary rights to fishing, recognized in various treaties, as being only a right to fish for subsistence purposes. Ray's study of Cree and Ojibwa fisheries in Northern Ontario establishes, to the contrary, that both peoples, especially their women, had been accustomed to fishing for trade with the Hudson's Bay Company long before any treaties were signed (pp. 80-96). J. Michael Thoms found that the desire of the Ontario government to "conserve" fish for American sport fishers was critical in the undermining of the Opwaaganisining First Nation's traditional fisheries on the Nipigon River (pp. 170-192). This First Nation had been using "gillnets, spears, weirs, and baited gear" by the time of contact with Europeans to catch a variety of fish such as sturgeon, pike, lake trout and whitefish. They had further developed kin-based means of controlling access to such fish. Throughout the late 19th century, efforts by the provincial government and the Canadian Pacific Railway to promote the tourist trade in the area led to the marginalization of the First Nations fisheries. The Opwaaganisining had long proven able to develop sustainable trade in their fisheries, but the pressure on fish stocks caused by sport fishing, combined with the bourgeois aesthetic embedded in sport fly-fishing, led to demands that their traditional fisheries be curtailed. While the Ontario government did not use legislation to limit Aboriginal fishing, it used conservation rules, licences and fishery guardians to harass the First Nations through the 1920s. In the end, industrial developments on the river, combined with sport fishing, depleted fish stocks and undermined the Opwaaganisining fishery in a way that devalued and criminalized "an indigenous management system that offered alternative values and approaches to understanding and harvesting the river's biology" (p. 189). Dianne Newell similarly found, in the case of the British Columbian Kitkatla commercial spawn-on-kelp harvests that Aboriginal people have insisted on their right to build commercial fisheries on traditional marine-resource use

(pp. 121-44). The Kitkatla have found that government regulations continue to frustrate their efforts.

The final essays in the Ommer and Newell collection suggest that coastal peoples everywhere have been insisting on finding their way into the management process usually considered by state authorities as their own prerogative. In British Columbia, a growing public sense of crisis over the perceived failure of DFO in fisheries management, especially of salmon stocks, led to public forums in 1995-96. Patricia Gallagher and Kelly M. Vodden describe how these forums brought together a variety of Aboriginal and non-Aboriginal coastal people (pp. 276-97). These people agreed that their proximity to marine resources gave them a right to share in the benefits and management, that their TEK was important in management and that their very presence on the coasts gave them management capabilities in resource monitoring, habitat protection and regulatory enforcement that governments could not match. While federal authorities have been guarded in their response, coastal communities have continued to organize for better management of their marine resources.

Evelyn Pinkerton offers some practical suggestions about how a more community-centred approach to marine resource management might work. She identifies a variety of co-management options in which the level of community involvement would depend on such factors as the multiplicity of resource users, the complexity of the resources they use and the social and cultural heterogeneity of the user groups. Regardless of the level of co-management, Pinkerton asserts that it can succeed best only by including communities of place rather than communities of interest that are defined by industrial sector or status as a quota holder. People who live adjacent to the resources they use tend to be more aware of the possible damage their activities inflict on ecosystems. Dependence on such resources means that communities are more likely to develop means of mitigating such damage, unlike ITQ holders, who could simply sell their quotas before the effects of over-fishing became obvious: "In other words, the institutional arrangements allow them to avoid the costs of non-sustainable use by selling out when the discount rate is high. In many fisheries, overexploitation and its effects may not be detectable for years. This situation leaves fish stocks highly vulnerable to individual 'fish-and-get-out,' highgrading, quote busting, price-dumping, quota-ratcheting, and data-fouling strategies" (pp. 350-1). Her insistence on the importance of a community place in fisheries management is supported by Daniel J. Pauly. He suggests that "successful future management schemes, whether based on market incentives, on co-management, or on governance arrangements, must involve local communities living in real places and exploiting stocks that have places as well" (p. 356).

Bonnie McCay notes that crab fishers on Fogo Island, on the northeast coast of Newfoundland, have persisted in their resistance to ITQs (pp. 301-20). While some individual entrepreneurs were aware of the opportunities for accumulating capital that privatization of the common property resource would make available, most fishers continued to insist that the right of common property remain as part of embedding fishing within the community. People continue, amidst crises in the fisheries, to defend community rights of access to marine resources. The local debate over the advisability of quotas began in 1992, and it continued through 1996, when crab fishers agreed on limited boat quotas. Unfortunately, the long-term viability of communal

strategies based on embeddedness may be limited by the very nature of the shock of fisheries collapse itself. Peter R. Sinclair, with Heather Squires and Lynn Downton, found that the social trauma of the northern cod moratoria effectively disembedded many of the people of Newfoundland's Bonavista Peninsula (pp. 321-39). Their interviews of a sample of 320 households and related participant-observer research between 1994 and 1995 revealed that many people felt they had no choice but to leave the area altogether. Those who had decided to stay had little concept that local forms of collective action could help; they tended to look to the state for support and to develop fairly limited, immediate-family strategies for survival.

The best analysis of the relationship between provincial and federal policies in the development of the Newfoundland fishing industry to have emerged since 1992 is Miriam Wright, *A Fishery for Modern Times: The State and the Industrialization of the Newfoundland Fishery, 1934-1968* (Toronto, Oxford University Press, 2001). Wright successfully challenges the notion that we can blame over-fishing on the innate tendency of fishers to deplete fish as common property. She argues instead that the crisis is the direct result of the expansion of industrial fisheries in the 1940s and 1950s. The critical aspects of this expansion were technological: the development of the offshore otter trawler, the factory-freezer trawler and freezing technologies in processing allowed over-fishing to take place. Wright points out that Newfoundland and Canadian politicians and bureaucrats manufactured popular consent for this industrial expansion. She uses the concept of hegemony to argue that these government officials promoted the interests of a narrow sector of the fishing industry so that the wider population came to accept them as "common sense" (pp. 4-5). The narrow vision was modernizationist: a social and economic theory of progress that became popular after the Second World War and is often associated with economist W.W. Rostow. This modernization thinking suggested that all economies should pass through similar stages of development defined by a progressive transition from "traditional" (rural, non-market and preindustrial) to "modern" (urban, commercial and industrial).

Wright traces the narrow interest to "a small group of former saltfish merchants" in the early 1940s who were willing to move into the new fresh-frozen industry, particularly Hazen Russel, of Job Brothers and Co., and Arthur Monroe. These merchants appreciated the growing opportunities of the American market, but also the willingness of Newfoundland governments to assist them financially. First the Commission of Government and then the provincial and federal governments in Newfoundland hoped to use the new industrial fishery to lessen local dependence on the troubled salt fishery and to provide cash-waged employment to Newfoundlanders. Along with this economic goal, governments embraced a general ideological belief in the values of modernization. The federal Department of Fisheries had a particular commitment to the ideological and economic goals of modernization by the 1950s and put a great deal of effort into convincing fishing people that they should embrace these as well. Newfoundland's new premier, J.R. Smallwood, had a similar commitment to the notion that modern science and methods of industrial production could stimulate economic growth. While Smallwood's first governments included different ideological tendencies, reflecting particularly the values of cooperativism, the federal commitment to modernization and Smallwood's increasingly close association with industrial capitalists meant that the provincial government accepted modernization as

the best plan for the fishing industry. As political discontent among local fishers grew about the growth of the industrial fresh-frozen sector, particularly about the proliferation of new industrial fishing ships on their grounds, Smallwood tried to get federal support for plans to revitalize the salt fishery. The federal government refused to give much support to Smallwood's plans and invested more money in technological development, education programmes and community resettlement to support the "modern" fishing sector.

Wright also makes it clear that she has no idea about how fishing people viewed the shifting nature of fisheries policy in Newfoundland (p. 63). Methodologically, the book is a conventional political study of government records and interviews with people who were prominent in the policy process of the time. More importantly, Wright looks only for the views and actions of those people; she does not engage in any of the questions and/or methods of Canadian social history as it has emerged and diversified in the past 30 years. This is odd for a book that has been published in Oxford University Press's "The Canadian Social History Series" and reflects a problematic understanding of hegemony as a concept. Wright's introduction acknowledges the importance of recognizing that hegemonic ideas reflect the uneasy and unequal compromises between ideas that originate in many different levels of society. There is, however, little sense of the manner in which fishing people's ideas shaped emerging fisheries policy. Raymond Blake, for example, in *From Fishermen to Fish*, claims that they wanted modernization. Wright does not have a clear position on this issue and tends to treat hegemony as an instrument of the state that is used to hammer people's views on fisheries policies into the desired shape. There is an implicit argument that government publicity campaigns, development and educational programmes convinced people of the wisdom of modernization, but we do not know how people otherwise thought about the implications of the expansion of fishing capacity. Unless we know more about the history of fishing people's ideas about fisheries modernization, we will not be able to address adequately the bio-economic assertions of the tragedy of the commons perspective and the ethical considerations of fisheries policy that may consequently arise.

It is unlikely that better fisheries policies will emerge without considering and acting on wider ethical considerations than market imperatives. At least that is the message of the essays contained in Harold Coward, Rosemary Ommer and Tony Pitcher, eds., *Just Fish: Ethics and Canadian Marine Fisheries* (St. John's, Institute for Social and Economic Research, 2000). The contributors to this volume, according to Conrad Brunk's and Scott Dunham's introduction and Ommer's conclusion, all root the ethical concerns of fisheries management in four forms of justice: *distributive* concerns about the fair distribution of the wealth generated by the exploitation of resources; *productive* concerns about how marine ecosystems may be used to produce the resources required for economic activity; *restorative* concerns about returning ecosystems to productive levels before they had been severely damaged by human exploitation; and *creative* concerns about finding new ways to integrate different forms of knowledge and types of management to achieve justice in its other forms (pp. 9-33, 271-6). Taken together, these ethical considerations of justice can lead to a sense of ecosystem justice – a need to understand that all resource use must be considered in terms of its impact on all of the constituent elements of the ecosystems, humans included. Human claims to rights of access to marine resources, or any other resources

within ecosystems, may be considered by three criteria: the extent of particular people's dependency on resources; the extent to which they contribute to the flourishing of the resource in its ecosystem; or the extent to which they place stress on the resource and its ecosystem.

The history of the European occupation of North America makes understandable the tendency of many authors in this collection to assess the justice of claims to marine resources in particular ways. Aboriginal fisheries are considered more just than those of non-Aboriginal peoples, and Western concepts of mastery over nature (usually associated with Christianity) are seen to have led to forms of resource management and exploitation that are less just than non-Western concepts of an essential divinity uniting all elements in nature, including humans. Pacific Coastal Aboriginal people claim that their fisheries are more just because they have been defined by cultural conceptions of the essential interdependence of people and ecosystems. Such conceptions lead to a much more needs-based use of natural resources that promotes respect for the natural world and a commitment to egalitarian use of the wealth generated by society (see especially the essays by Russ Jones and Terri-Lynn Williams Davidson, pp. 100-115, 201-24).

The essays in this collection make strong arguments about the manner in which, by almost any criteria, the modern industrial fisheries of the late 20th century cannot be considered just. Ecosystems, for example, depend on overall biotic diversity if they are to continue to produce successfully any particular population of organisms that people might use for economic purposes. Daniel Pauly et al. demonstrate that the industrial fisheries of the Atlantic and Pacific coasts have long targeted individual species of fish as if they have not been interdependent with other organisms (pp. 34-46). The result has been over-specialization and over-exploitation of "commercial" species concomitant with growing perceptions about the apparently "excessive" numbers of "underutilized" species relative to the declining numbers of the original, targeted species. The overall effect is that industrial fisheries everywhere engage in the phenomenon of fishing down the food chains of marine ecosystems, narrowing their overall diversity at the same time. Nigel Hagan further makes a powerful point about the manner in which the development of modern market relations in fisheries has, through the division of labour, specialization of market production and unequal distribution of benefits, made it very difficult for all of the groups which have a stake in effective fisheries management to perceive accurately the long-term harm that has been inflicted on marine ecosystems (pp. 83-99). Recent notions of "sustainability" associated with bio-economic modelling emphasize sustaining industrial fishing activity as it existed, without restoring the biodiversity damaged by such fishing. Hagan argues that TEK can be a powerful tool to better understand long-term resource depletion as a first step in restoring biodiversity. Barbara Neis and Melanie Morris offer a practical illustration that using such knowledge is a form of creative justice: a commitment to better forms of knowledge that ultimately will transform the management process itself (pp. 174-200). In the case of the Newfoundland capelin fishery, DFO scientists in the 1980s began to examine fishers' knowledge as it became apparent that the rapid development of that fishery was leading to declining abundance. These scientists did so because their department did not otherwise have the means to afford better assessment of the impact of fishing on capelin. While scientists obtained a better understanding of what was happening to capelin by

interviewing fishers, they also became more aware of the fishers' practical concept of fish as part of a more complex environment, and of the strong commitment of fishers to the importance of access to that fish for their own communities.

Rosemary Ommer suggests that the development of capitalism has largely been responsible for the inability of people to perceive the damage that their economic activity has been inflicting on ecosystems (pp. 117-39). Since the beginnings of the European fisheries in what is now Atlantic Canada, the organization of fish production for the market has resulted in a process whereby capital has interposed itself between people and the resources they depend on. State forms of property rights became important as the need for capital displaced the need for labour provided by local communities in more far-ranging industrial fisheries, and such fisheries removed fishers from the intimacy of community proximity to resources. The transnational consolidation of capital and the global quest for the few remaining commercially abundant species has eclipsed even such state forms of controlled access in recent times. Governments prefer to privatize fisheries through quota management schemes so that the global marketplace may absorb the costs. The quota management of global fisheries imagined by the proponents of ITQs depends on methods for setting quotas that bear no resemblance to reality: "the *rhetoric* of stewardship remains in the global fishery lexicon, but its logic does not – distance, computers, models, and formulae that have but slight resemblance to the functioning of fish and humans in an ecosystem do not make for accurate stock prediction" (p. 134).

The contributors to *Just Fish*, like Evelyn Pinkerton in *Fishing Places, Fishing People*, argue that the transferability of fish quotas, by disassociating fishing effort from community impact, allows quota owners to see depletion only as a cost. If that cost proves to be no greater than the opportunity to take the short-term wealth generated by over-exploitation and invest it in some new form of economic activity, then resource depletion will likely occur. Michael M'Gonigle, Jana McLean and Ommer argue that the only way to avoid this is to entrench the community in fisheries management through community-based co-management systems (pp. 254-70). Tony J. Pitcher and Melanie D. Power show that fishers are capable of distinguishing between forms of fishing that are sustainable or not in ways that are quantifiable, but not linked to private property rights. Such quantification can allow communities to make choices about fishing practices to avoid harming fish abundance under the conditions of uncertainty that plague fish-stock assessment (pp. 225-53). Other contributors to *Just Fish* maintain that the market ideology that underlies the commitment to ITQs is unethical. The reality that most fish is food has now become subordinate to its market nature as a commodity to be exchanged in the most lucrative fashion possible, and this is perhaps the most fundamental change. The global marketplace, point out Barbara Neis, Russ Jones and Ommer, is full of examples of local communities being excluded from the right to fish directly for themselves even as industrial over-fishing jeopardizes food security generally (pp. 154-73). The notion that market exchanges can produce the most efficient allocation of resources does not allow for any consideration of whether or not such treatment of our global food supply is a just policy (see the essay by Ussif Rashid Sumaila and Mahamudu Bawumia on "Ecosystem Justice and the Marketplace", pp. 140-153).

Proposals for the improvement of the science and management of fisheries can be found in Barbara Neis and Lawrence Felt, eds., *Finding Our Sea Legs: Linking*

Fishery People and Their Knowledge with Science and Management (St. John's, Institute for Social and Economic Research, 2000). The collection continues the editors' exploration of the value of TEK in fisheries management, but because of the association of TEK with indigenous peoples, they prefer the term local ecological knowledge (LEK) to avoid the conclusion "that commercial fishery people do not have an extensive repertoire of ecological and fisheries-related understanding" (p. 13). The essays in this collection generally suggest that effective use of LEK will mean more decentralized and locally responsive fisheries management. They also provide an international perspective on the value of LEK. Johanne Fischer, for example, contributes a case study of the manner in which Nicaraguan fishers provide information that can augment scientific knowledge about the relationship between fishing and fish and the natural environment and ecology of fish (pp. 41-54). She suggests that forms of participatory observation may give scientists a broader perspective than is usually possible through the time or place-specific studies they usually engage in. Louise Gendron, Réjeanne Camirand and Josée Archambault's use of semi-structured interviews with Magdalen Islands lobster fishers in 1995 revealed much new information for scientists and illustrated fishers' willingness to reevaluate and augment their knowledge based on what they learned from fisheries scientists (pp. 56-71).

The value of LEK in better understanding the complexity of fish stocks emerges from Joseph Wroblewski's scientific confirmation of local assertions about the existence of a specific resident sub-stock of cod in Gilbert Bay, Labrador (pp. 72-81). Edward Ames, Stephanie Watson and James Wilson find that the methodologies of oral history reveal that the fishers of eastern Maine have detailed knowledge about the long-term extinction of sub-stocks of cod through commercial exploitation of little-known inshore spawning grounds (pp. 153-64). Much closer reciprocal relationships between scientists and fishers through organizations such as the non-profit Fishermen and Scientists Research Society in the Maritimes, suggest Kees Zwanenburg, Patricia King and Paul Fanning, produce better fishers' participation in fisheries research (pp. 124-32). Paul Macnab found that fishers who had traditionally worked in the waters off the Eastport Peninsula, Bonavista Bay provided sound knowledge that contributed to the successful mapping of marine resources through geographic information systems (pp. 224-35).

Some of the essays in the Neis and Felt collection highlight pitfalls in the practice of LEK-informed fisheries science. Martin Purps, Ulrich Damm and Thomas Neudecker found that data collected by fishers in the German commercial brown shrimp fisheries was unreliable, largely because these fishers used sampling techniques designed by scientists, but without much subsequent support (pp. 111-23). Anita Maurstad's discussion of efforts by interdisciplinary teams of social scientists, scientists and fisheries managers to collect and use fishers' LEK in northern Norway between 1994 and 1996 reveals that the special interests of the investigators themselves influence representations of fishers' knowledge. Maurstad's desire to convince fisheries managers of the utility of LEK led her to render this knowledge in the terms of fisheries biology that such managers were familiar with and respected. This desire meant that Maurstad tended to present LEK bereft of the wealth of knowledge about customary means by which fishers governed their own conduct in the fisheries. Maurstad warns that this approach risks reducing LEK to a means of

augmenting conventional fisheries science without contributing the transformative impact that the failures of recent fisheries management require.

The transformative potential, as Andreas Roepstorff argues, lies in the manner in which LEK can make fisheries development and management more participatory and oriented towards practice and social action as well as theories and models (pp. 165-88). His study of the exchanges between government biologists and fishers in the Greenland halibut fishery in Disko Bay reveals that the language of stock assessment science has been so embedded in the statistical modelling techniques of the scientists that fishers have trouble reconciling it with their knowledge of the real world in which they actually catch fish. The frustrations on both sides have risked a hardening of commitments to their own systems of knowledge and a deepening of mistrust. The solution, Roepstorff suggests, may be to move away completely from stock-modelling exercises by explicitly accepting that fish are part of an environment that is “inherently variable and unpredictable” (p. 185). Nicole Power’s demonstration that a great deal of valuable information about changes in fish populations can be learned from the observations of women who work in fish plants further warns that fisheries management need not depend on patriarchally constructed forms of knowledge, including forms of LEK (pp. 189-203). Processing fish depends on its quality and texture. Handling fish has made plant workers, who are mostly women, sensitive observers about the changing nature of fish generally. In general, women observed that they had been processing smaller volumes over time, and that it took far more fish to make up even such volumes (an indicator of smaller average size). As well, women observed that fish flesh tended to be softer over time, indicating that fish spent more time in certain types of gear such as gill nets, and more time in boat holds and trucks (an indication of the expanding spatial scale of fisheries associated with resource depletion).

The potential benefits of finding inclusive ways to listen to LEK must be accompanied by a genuine attempt on the part of fisheries managers to act on this knowledge. Steve Sutton demonstrates that sport anglers accumulated accurate knowledge about a unique population of Atlantic salmon in the vicinity of Southwest Pond in Bonavista Bay, Newfoundland (pp. 206-23). This knowledge meant that anglers have very specific ideas for new management and monitoring techniques that, in turn, had local community support. He argues that the availability of such evidence, and the corresponding willingness of local people to suggest management practices, can contribute to community-based management if it has government support and a commitment to fund scientific verification. Jeffrey A. Hutchings and Mark Ferguson found that interviews with inshore fishers provided evidence of the long-term decline in the abundance of northern cod, and that fishers responded by increasing the harvesting efficiency of their fishing gear (pp. 82-110). Fishers knew that there was a relationship between the expansion of harvesting capacity in the fishery and the decline of northern cod, and they accepted the need for restrictions on gear, closed seasons and greater enforcement and monitoring. Fishers also accepted that governments must use quotas to control fishing effort, but insisted that such quotas should not be transferable. Taken along with the fishers’ view that DFO’s management must be improved and their desire to see corporate influence lessened in the fishery, this commitment to quotas without transferability suggests that fishers expect that their knowledge will be used to enhance community fisheries.

The benefits of such government support for the enhancement of community fisheries have been revealed in the case of the Eastport, Newfoundland lobster fishery, studied by Sherrylynn Rowe and George Feltham (pp. 236-45). By 1993, local fishers had begun to notice declining catch rates, and in 1995 they formed the Eastport Peninsula Lobster Protection Committee to self-manage this fishery. In partnership with DFO, Parks Canada and Memorial University, these fishers developed a local management regime that limited access to local fishers. Furthermore, local fishers agreed to close two areas within their own fishing area to all fishing and to notch the tails of egg-bearing females so that they would not be harvested anywhere on the local fishing grounds. The Protection Committee implemented methods of self-enforcement of their rules, backed up by DFO surveillance and other forms of assistance. The local fishers depended on the support of scientists from their institutional partners to provide supportive monitoring. The result has been improved landings in the area and better cooperation with scientists and fisheries managers.

The methodologies for collecting and incorporating LEK will have to undergo a constant process of critical analysis and refinement just as should any other methodologies used to better support fisheries management. As James R. McGoodwin, Neis and Felt point out in the conclusion to this collection, conditions in world fisheries, currently dominated by management regimes based on modern bureaucracies and science, can hardly be much worse (pp. 249-64). They suggest that the deplorable conditions of modern fisheries may be attributed as much to the manner in which modern management of common-property marine resources overrode the capacity of fishers to develop effective local management regimes. Modern management further ignores the fact that local fishers globally have indicated their commitment to controlling their own access to common resources to avoid depletion. Gísli Pálsson suggests that the core of dominant fisheries management continues to be a commitment to bio-economic modelling that emerged out of the tragedy of the commons model. The nadir of such management has been faith in the ability of stock assessments to set TACs, that in turn can be subdivided into ITQs. Pálsson points out that, in the case of Icelandic fishers, much knowledge of fisheries, like most forms of knowledge, comes not from “a purely cognitive or cerebral process, but is rather grounded in the contexts of practice, involvement, and personal engagement” (p. 37). The implication of Pálsson’s argument is that, for fishers and people generally, trusting to bio-economic modelling for sound fisheries management is much like a traveller placing her or his fate in the hands of a ship’s captain who has only ever steered a vessel from a bridge simulator.

This review essay concludes with a special plea for the importance of more historical analysis in the formation of future fisheries management. Many of the authors here have made excellent cases for the need for interdisciplinary and multidisciplinary scholarship to support sound management practices. Except for Miriam Wright, and some of the contributors to the Ommer and Newell collection, historians regionally and nationally have done very little to suggest that their discipline can do much to help Canadians address fisheries problems. In the case of the Candow and Corbin collection, there is little that can help us to better understand what led to the collapse of regional fish stocks. If the Candow and Corbin collection does not do much good, then at least it does little harm. The same may not be said of Blake’s book. Its shallow historical analysis perpetuates many of the myths and

misconceptions about the development of Canadian fisheries that have long misinformed fisheries management.

These myths and misconceptions are popular among the proponents of fisheries privatization through ITQs: that fishers have been natural squanderers of common property resources; that the employment demands of fishers rather than governments' ideological commitment to a specific form of industrial development have forced the development of over-capacity in Canadian fisheries; and that fisheries science would accurately predict the greatest levels of fishing effort if not for the political pressure of fishers. Many of the books discussed here demonstrate that these misinterpretations are unacceptable, and that fisheries management regimes built upon them will be unethical and unjust from the perspective of human societies and the survival of ecosystems. Other works have demolished the notion that the collapse of fish populations may be understood by environmental factors rather than over-fishing. Many works support the view that the over-capacity of the fishing industry resulted from governments' ideological, institutional and political commitments to one form of Fordist industrial organization. Such commitments have shaped the work of fisheries scientists and managers, particularly in their faith in abstract bio-economic modelling, dismissal of LEK and disregard for alternate visions of co-management regimes.

Better history will support the development of better fisheries management in a number of ways. Attempts at historical understanding underwrite the criticisms of the market paradigms that have been so popular in the mainstream of fisheries management thinking. At times, we simply need to know more. Apostle et al., for example, make much of the differences in Norwegian and Canadian approaches to social democracy, but they do not suggest why such differences exist. Other historical understanding is technologically deterministic, as in the case of Rogers, some of Ommer's work and Wright's. These authors doubtless have a deeper perspective on the history of the current fisheries crisis, but there does not yet exist a solid foundation of historical scholarship on which to build their interpretations. Similarly, until there are studies of fishers' own views about how fisheries should develop, and how such views changed over time, we cannot discuss the emergence of hegemonic ideas about fisheries management.

There is a practical reason for better histories of Atlantic Canadian fisheries. First, many of the methodologies associated with LEK and the re-assessment of scientific data are fundamentally historical enterprises. While other social scientists and scientists have maintained their ideal commitment to the importance of transforming science and management through such work, they tend to fall into the trap explored by Maurstad: social scientists often try to be better fisheries scientists than the scientists. The value of the humanities in understanding the contributions that culture can make to better future management has yet to emerge, except in studies of Aboriginal fisheries. The latter case raises the second reason for the importance of history. Most of our understanding about the problematic assertions of market theorists of fisheries management comes from what might be thought of as an anthropological concern with management practices and LEK that differ by place. This allows Canadian fisheries managers a certain sleight-of-hand – to say, for example, that what works among indigenous peoples, or for people in the Pacific or Latin America will not work among Atlantic Canadians. This is a misguided view that

devalues the contributions of the anthropological perspective. It would be less influential, however, if there were more studies about how management practices have varied over time within Atlantic Canadian fishing communities. There is good reason to believe that the cultural concepts of alternate forms of fisheries management that we can see in other lands may not be so “foreign” to the customs and traditions of Atlantic Canada.

There is a final, stark reason for the importance of history. Should the myths and misconceptions of privatization prevail, then coastal communities will face dislocations no less significant than previous forms of enclosure have been within the history of the Anglo-American world, and forms of dispossession as traumatic as those faced by Aboriginal peoples. If better history fails to help in forestalling such tragedies, it will at least help to document what has been lost, to preserve a record of for whom the fisheries existed and to remember who made the decisions to make it so.

SEAN CADIGAN